Controls, Start-Up, Operation, Service and Troubleshooting

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SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment. Untrained personnel can perform the basic maintenance functions of replacing filters. Trained service personnel should perform all other operations.

When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply. Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ WARNING

Before performing service or maintenance operation on unit turn off and lock off main power switch to unit. Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation and service. The unit may have an internal non-fused disconnect or a field-installed disconnect. **Note that the unit may also be equipped with a convenience outlet, that this outlet is wired to the line side of the unit mounted disconnect and will remain hot when the disconnect in the unit is off. There is a separate fuse/disconnect for the convenience outlet.**

⚠ CAUTION

This unit uses a microprocessor-based electronic control system. ***Do not*** use jumpers or other tools to short out components or to bypass or otherwise depart from recommended procedures. Any short-to-ground of the control board or accompanying wiring may destroy the electronic modules or electrical components.

⚠ WARNING

1. Improper Installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Refer to the User's Information Manual provided with this unit for more details.
2. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

What to do if you smell gas:

1. DO NOT try to light any appliance.
2. DO NOT touch any electrical switch, or use any phone in your building.
3. IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
4. If you cannot reach your gas supplier call the fire department.

GENERAL

This book contains Start-Up, Controls, Operation, Troubleshooting and Service information for the 48/50A series rooftop units. See Table 1. These units are equipped with *Comfort*Link™ controls.

Table 1 — A Series Product Line

UNIT	APPLICATION
48AJ	CV Unit with Gas Heat, Vertical Supply
48AK	VAV Units with Gas Heat, Horizontal Supply
48AW	CV Unit with Gas Heat, Vertical Supply
48AY	VAV Unit with Gas Heat, Horizontal Supply
50AJ	CV Unit with Optional Electric Heat, Vertical Supply
50AK	VAV Units with Optional Electric Heat, Horizontal Supply
50AW	CV Unit with Optional Electric Heat, Vertical Supply
50AY	VAV Unit with Optional Electric Heat, Horizontal Supply

LEGEND
CV — Constant Volume
VAV — Variable Air Volume

IMPORTANT: This literature contains start-up, controls, operation, troubleshooting and service information for the 48/50A series product. Use this guide in conjunction with the separate installation instructions packaged with the unit. Refer to the Wiring Diagrams literature for more detailed wiring information.

The A series units provide ventilation, cooling, and heating (when equipped) in Variable Air Volume (VAV), Variable Volume and Temperature (VVT®), and Constant Volume (CV) applications. The 48AJ,AK,AW,AY and 50AJ,AK,AW,AY units contain the factory-installed *Comfort*Link™ Control System which provides full system management. The Main Base Board (MBB) stores hundreds of unit configuration settings and 8 time of day schedules. The MBB also performs self diagnostic tests at unit start-up, monitors the operation of the unit, and provides alarms and alert information. The system also contains other optional boards that are connected to the MBB through the Local Equipment Network (LEN). Information on system operation and status are sent to the MBB processor by various sensors and optional boards that are located at the unit. Access to the unit controls for configuration, set point selection, schedule creation, and service can be done through a unit-mounted Scrolling Marquee. Access can also be done through the Carrier Comfort Network using the ComfortVIEW™ or the accessory Navigator hand-held display.

The *Comfort*Link system controls all aspects of the rooftop. It controls the supply-fan motor, compressors, and economizers to maintain the proper temperature conditions. The controls also cycle condenser fans to maintain suitable head pressure. All VAV units are equipped with a standard VFD (variable frequency drive) for supply fan speed control and supply duct pressure control. The *Comfort*Link control directly controls the speed of the VFD based on a static pressure sensor input. In addition the *Comfort*Link control can adjust the building pressure using multiple power exhaust fans controlled from damper position or from a building pressure sensor. The control safeties are continuously monitored to prevent the unit from operating under abnormal conditions. Sensors include suction pressure transducers and saturated condensing temperature sensors which allow for display of units operational pressures and saturation temperatures.

A scheduling function, programmed by the user, controls the unit occupied/unoccupied schedule. Up to 8 different schedules can be programmed.

The controls also allow the service person to operate a quick test so that all the controlled components can be checked for proper operation.

Configurable Features — The unit and the controls are capable of a large range of configurable features as standard and also support additional features using factory-supplied options and field-installed accessories. The A series units can be used with CV, VVT, and VAV applications. The following features are common to all units:

- Optional two-stage demand economizers with fully proportional dampers and integrated compressor capacity to provide the greatest amount of free cooling savings.
- Digitally controlled communicating economizer motors providing diagnostic feedback.
- Support of minimum economizer position for ventilation.
- Support of remote economizer position input.
- Support of economizer changeover using outdoor air dry bulb, differential dry bulb, outdoor air enthalpy, differential enthalpy, custom enthalpy/dewpoint and dry bulb changeover control or remote enable/disable control.
- High outdoor air dewpoint economizer lockout.
- Use of humidity sensors and drybulb sensors to measure outdoor and return air enthalpy.
- Support of indoor or return air CO_2 IAQ (indoor air quality) sensor or a remote IAQ input signal for use in demand control ventilation.
- Support on an optional outdoor air CO_2 sensor.
- Demand control routines allowing for adjustable response curves to the differential IAQ levels.
- All units are equipped with supply air, return air, and outside air temperature sensors and the control automatically calibrates the economizers to allow for mixed-air temperatures after the economizer dampers.
- Outdoor-air temperature/supply-air temperature monitoring with logic to lock the compressors out at low ambient conditions.
- All units are equipped with suction pressure transducers for low pressure protection and coil freeze protection.
- All condensers are equipped with saturation temperature sensors and, combined with the suction pressure transducers, allow for direct readout of suction and discharge pressures and saturation temperatures.
- Integral reverse rotation protection for compressors.
- Compressor safety overrides (power up and minimum on and off timers) ensure oil return in low load conditions.
- Automatic lead-lag control of compressors reduces the number of compressor cycles.
- Direct control of optional hot gas bypass.
- Control of the indoor fan on/off operation including occupied and unoccupied control as well as delayed on/off control.
- Control of the power exhaust fans based on configurable damper positions or input from an optional building pressure sensor.
- Control of a condenser fan based on outdoor-air and condensing pressures.
- Support of an accessory Motormaster® V control for low ambient applications when an economizer cannot be used.
- Scrolling Marquee display is standard on all units and includes 4-character alpha-numeric display that can be expanded to 24-character text message for easy operation, configuration, and troubleshooting of the *Comfort*Link™ control.
- All units equipped standard with an alarm relay output.
- Control and system diagnostics with alarm history and full text descriptions.
- Support a field test for field check out and diagnostics.
- Support of remote occupied/unoccupied input to start and stop the unit.
- Support of remote start/stop input.
- Support of a field-installed accessory or factory-installed option filter pressure switch.
- Support of an accessory, field-installed fan status pressure switch.
- Enable heating (if installed) or cooling during unoccupied periods as required to maintain space temperature within the unoccupied set points.
- Support of demand limiting using external switch inputs or an external 4 to 20 mA signal.
- For units connected to the CCN (Carrier Comfort Network), the user can also display all the unit information including I/O values for Maintenance, Configuration, Service, and Set Point data tables.

Constant Volume Features — For constant volume applications, the *Comfort*Link control can support electromechanical or electronic thermostats that use a Y1, Y2, W1, W2, and G inputs. The control can also support the use of a 10K space temperature thermistor. The following are additional features with constant volume applications.

CONVENTIONAL THERMOSTAT CONTROL

- Control of unit using Y1, Y2, W1, W2, and G thermostat.
- Interface with remote time of day scheduling.
- Use of the internal *Comfort*Link timeclock routines for control of the occupied and unoccupied modes and the minimum ventilation position of the economizer.
- Two-stage heating (if installed).
- Multiple stage gas heating controlled to a supply air temperature set point if equipped with the staged gas heat option.
- Two-stage cooling or adaptive multiple stage cooling which can provide up to 6 stages of capacity with a 2-stage thermostat.
- Support of thermostat alarm light output.

SENSOR CONTROL OF UNIT — Unit that are equipped 10K space temperature thermistor sensors can be used on CV applications. The set point is configured in the unit Scrolling Marquee display and can be set from 55 F to 80 F. There are 3 sensor options available:

The T-55 sensor monitors room temperature and provides unoccupied override capability (1 hour).

The T-56 sensor monitors room temperature, provides unoccupied override capability (1 hour), and provides a temperature offset at the thermostat of 10° F maximum.

The T-58 is a CCN communicating sensor that provides set point configuration and space temperature.

Standard features are:

- Occupied or unoccupied set points.
- Fully closed ventilation economizer positions during unoccupied conditions.
- Adjustment of space temperature set points of ± 10° F when using a T-56 sensor.
- Two-stage cooling or adaptive multiple stage cooling which can provide up to 6 stages of capacity.
- Two-stage heating (if installed).
- Multiple stage gas heating controlled to a supply air temperature set point if equipped with the staged gas heat option.
- 365-day timeclock with backup (supports minute, hour, and day of week, date, month, and year access). The unit timeclock includes or enables the following features:
  - — Daylight savings time function.
  - — Occupancy control with 8 periods for unit operation.
  - — Holiday table containing up to 9 holiday schedules when programmed from the Scrolling Marquee and up to 30 when programmed from CCN.
  - — Ability to initiate timed override from T-55 or T-56 sensors (for a timed period of 1 to 4 hours).
  - — Temperature compensated start to calculate early start times before occupancy.
  - — Pre-occupancy purge cycle.
  - — For units connected into a CCN network, the timeclock can be integrated into the overall building Energy Management System and be updated remotely.

Variable Air Volume (VAV) Features — The 48/50AK,AY units are designed to operate in VAV applications. As standard, the units include a supply fan VFD to control the supply cfm and duct pressure. The units are designed to control the leaving-air temperature in cooling to configurable set points. The control, depending on the selected options and accessories, will operate in one of three primary modes which are heating, ventilating and cooling. Initiation of these modes is configurable from the return air temperature sensor, which is factory supplied, or from a space temperature sensor.

Some special features on VAV applications are:

- Provide cooling control to a supply air temperature in both occupied and unoccupied modes.
- Supports morning warm-up heating mode which is used when changing from unoccupied to occupied mode.
- Supports an optional space temperature sensor for mode control and supply air temperature reset.
- Interface with DAV (Digital Air Volume) control systems through linkage.
- Support of static pressure reset when used with DAV systems.
- If space sensor is equipped with an override feature, the sensor will allow operation during the unoccupied period for a fixed length of time (1 to 4 hours).
- Control of two stages of heat to maintain return-air temperature.
- Multiple stage gas heating controlled to a supply air temperature set point if equipped with the staged gas heat option for use in supply air tempering.
- Base unit control supports a Heat Interlock Relay (field supplied) to signal the VAV terminal devices to operate at minimum required airflow for the heaters during heating operation.
- Controls the operation of the supply fan VFD to maintain a configurable supply duct static pressure set point. VFD is configured and controlled directly by the *Comfort*Link™ Controls. It also can be configured to operate from a third party control system.
- Cooling capacity control of up to 6 stages plus economizer.
- 365-day timeclock with backup (supports minute, hour, and day of week, date, month, and year access). The unit timeclock includes or enables the following features:
  - — Daylight savings time function.
  - — Occupancy control with 8 periods for unit operation.
  - — Holiday table containing up to 9 holiday schedules when programmed from the Scrolling Marquee and up to 30 holiday schedules when programmed from CCN.
  - — Ability to initiate timed override from T-55 or T-56 sensors (for a timed period of 1 to 4 hours).
  - — Temperature compensated start to calculate early start times before occupancy.
  - — Pre-occupancy purge cycle.
  - — For units connected into a CCN network, the timeclock can be integrated into the overall building Energy Management System and be updated remotely.

MAJOR SYSTEM COMPONENTS

General — The 48/50A series package rooftop units with electric cooling and with gas heating (48A units) or electric cooling and electric heating (50A Units) contain the *Comfort*Link electronic control system that monitors all operations of the rooftop. The control system is composed of several components as listed below. See Fig. 1-7 for typical control and power component schematics. Figures 8 and 9 show the layout of the control box, unit, and thermistor and transducer locations.

Factory-Installed Components

MAIN BASE BOARD (MBB) — See Fig 10. The MBB is the center of the *Comfort*Link control system. The MBB contains the major portion of the operating software and controls the operation of the unit. The MBB has 22 inputs and 11 outputs. See Table 2 for the inputs and output assignments. The MBB also continuously monitors additional data from the optional ECB1, ECB2, SCB, and CEM boards through the LEN communications port. The MBB also interfaces with the Carrier Comfort Network through the CCN communications port. The board is located in the main control box.

ECONOMIZER BOARD (ECB1) — The ECB1 controls the economizer actuator and the power exhaust fans. The ECB1 operates the economizer motor using a digital communication signal that also provides status and diagnostics for the economizer motor. See Fig. 11. The ECB1 also controls the operation of the power exhaust motors and provides up to 6 stages of digitally sequenced power exhaust either based on the economizer motor position or the building pressure. The board has 4 inputs and 6 outputs. Details can be found in Table 3. The ECB1 board is located in an auxiliary box located at the end of the unit behind the filter access door. The board also contains a second LEN port than can be used with the accessory Navigator display.

VAV BOARD (ECB2) — The VAV board (which is the same hardware as the ECB1) is used to control the supply fan on VAV units. See Fig. 11. It sends a 4 to 20 mA signal to the VFD based on a supply duct pressure sensor connected to the board. The board also accepts a signal from another pressure sensor that monitors building pressure and controls the operation of the optional modulating power exhaust motors. The board will also be used on CV units with the optional building pressure control feature and modulating power exhaust. This board is also used to control a digitally controlled hot gas bypass solenoid with an integral orifice for use in low load applications. This board is located in the auxiliary control box. Input and output assignments are summarized in Table 4.

STAGED GAS HEAT BOARD (SCB) — When optional staged gas heat is used on CV and VAV units, the SCB board is installed and controls operation of the gas valves. See Fig. 12. The SCB also provides additional sensors for monitoring of the supply-air temperature. This board is located in the gas heat section of the unit. The inputs and outputs are summarized in Table 5.

CONTROL EXPANSION MODULE (CEM) — The optional CEM is used to provide inputs for demand limiting, remote set point and other optional inputs typically need for Energy Management Systems. See Fig. 13. These inputs can be interfaced through the CCN communications. It is located in the main control box. The inputs and outputs are summarized in Table 6.

INTEGRATED GAS CONTROL (IGC) — One IGC is provided with each bank of gas heat exchangers (2 used on the size 020-050 units and 3 on the size 060 unit). The IGC controls the direct spark ignition system and monitors the rollout switch, limit switches, and induced-draft motor Hall Effect switch. The IGC is equipped with an LED (light-emitting diode) for diagnostics. See Table 7.

COMPRESSOR PROTECTION BOARD (CS) — This board monitors the status of the compressor by sensing the current flow to the compressors and then provides digital status signal to the MBB.

SCROLLING MARQUEE — This device is the keypad interface used to access the control information, read sensor values, and test the unit. The Scrolling Marquee display is a 4-key, 4-character, 16-segment LED display as well as an Alarm Status LED. See Fig. 14. The display is easy to operate using 4 buttons and a group of 11 LED's that indicate the following menu structures:

- Run Status
- Service Test
- Temperatures
- Pressures
- Set points
- Inputs
- Outputs
- Configuration
- Timeclock
- Operating Modes
- Alarms

Through the Scrolling Marquee the user can access all the inputs and outputs to check on their values and status. Because the unit is equipped with suction pressure transducers and discharge saturation temperature sensors it can also display pressures typically obtained from gages. The control includes a full alarm history, which can be accessed from the display. In addition, through the Scrolling Marquee the user can access a built-in test routine that can be used at start-up commission and to diagnose operational problems with the unit. The Scrolling Marquee is located in the main control box and is standard on all units.

SUPPLY FAN — The 20 to 50 ton units are equipped with two 15 x 11-in. forward-curved fans. The 60 ton units have three 15 x 11-in. fans. They are on a common shaft and are driven by common belt drive 3-phase motor. The fan is controlled directly by the *Comfort*Link™ Controls.

VARIABLE FREQUENCY DRIVE (VFD) — On variable volume units, the supply fan speed is controlled by a 3-phase VFD. The VFD is located in the fan section behind a removable panel as shown in Fig. 8 and 9. The VFD speed is controlled directly by the *Comfort*Link controls through a 4 to 20 mA signal based on a supply duct pressure sensor. The inverter has a display, which can be used for service diagnostics, but setup of the building pressure and control loop factors is done through the Scrolling Marquee display. The VFD is powered during normal operation to prevent condensation from forming on the boards during the off mode and is stopped by driving the speed to 0 (by sending a 0 mA signal to the VFD).

The A series units use Toshiba S9 and E3 VFDs. The interface wiring for the VFDs is shown in Fig. 15 and 16. The VFD connects through an isolation board to the 4 to 20 mA ECB2 board. Terminal designations are shown in Tables 8 and 9.

POWER EXHAUST — The units can be equipped with an optional power exhaust system. The power exhaust fans are forward-curved fans with direct-drive motors. The motors are controlled directly by the *Comfort*Link control through the ECB1 board. On the 20 to 50 ton units there are 4 fans. On the 60 ton units there are 6 fans. The fan sequences are controlled to provide 4 stages on the 20 to 50 ton units and 6 stages on the 60 ton unit. There are two control methods. For CV applications the fans can be configured for 2 stages based on adjustable economizer damper positions. For VAV applications and CV units with the building pressure control option, the fans are sequenced to maintain a building pressure set point based on a building pressure transducer.

ECONOMIZER MOTOR — The economizer outside air and return air dampers are gear-driven dampers without linkage. A digitally controlled economizer motor controls their position. The motor position is controlled by the ECB1 board by means of a digital two-way communication signal. This allows for accurate control of the motors as well as feedback information and diagnostics information. The control has a self-calibration routine that allows the motor position to be configured at initial unit start-up. The motor is located on the economizer and can be reached through the filter access door.

THERMISTORS AND PRESSURE TRANSDUCERS — The unit is equipped with thermistors for measurement of temperatures.

The units also have two pressure transducers that are connected to the low side of the system. These two pressure transducers measure the low side pressure and are used for low pressure protection and coil freeze protection.

By using the Saturated Condensing Temperature Sensors and the low side pressure transducers, the *Comfort*Link control displays the high and low side pressures and saturation temperatures and a normal gage set is not required.

SMOKE DETECTOR — The units can be equipped with an optional Smoke Detector located in the return air. The detector is wired to the *Comfort*Link controls and, if activated, will stop the unit by means of a special fire mode. The smoke detector can also be wired to an external alarm system through TB5 terminals 10 and 11. The sensor is located in the return air section behind the filter access door.

FILTER STATUS SWITCH — The units can be equipped with an optional filter status switch. The switch measures the pressure drop across the filters and closed when an adjustable pressure set point is exceeded. The sensor is located in the return air section behind the filter access door.

RETURN AIR CO_2 SENSOR — The unit can also be equipped with a return air IAQ CO_2 sensor that is used for the demand control ventilation. The sensor is located in the return air section and can be accessed from the filter access door.

BOARD ADDRESSES — Each board in the system has an address. The MBB has a default address of 1 but it does have an instance jumper that should be set to 1 as shown in Fig. 10. For the other boards in the system there is a 4-dip switch header on each board that should be set as shown below.

Board Address Settings

BOARD	SW1	SW2	SW3	SW4
ECB1	0	0	0	0
ECB2	1	0	0	0
SCB	0	0	0	0
CEM	0	0	0	0

0 = On; 1 = Off

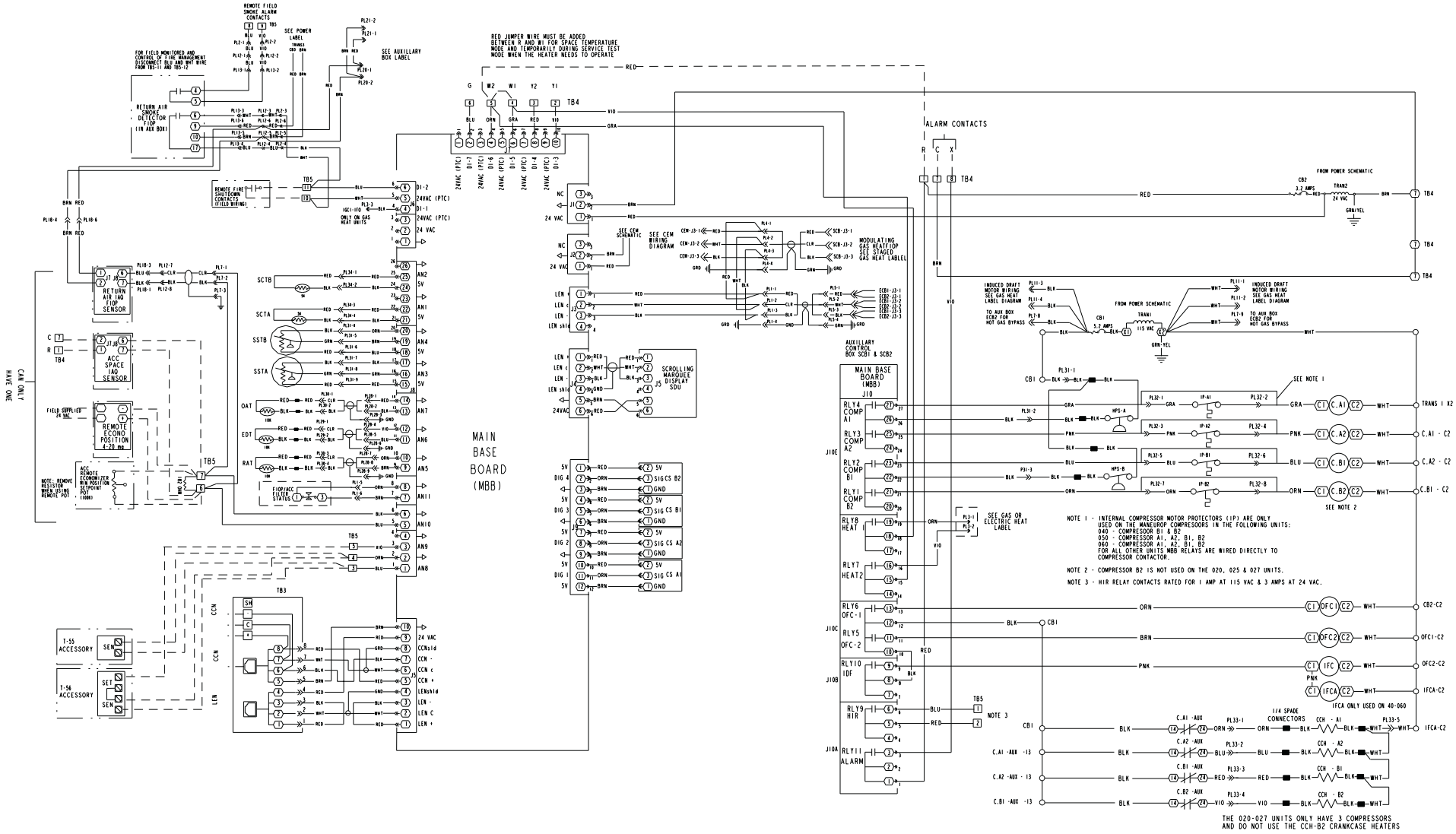

REMOTE FIELD SMOKE ALARM CONTACTS
SEE POWER LABEL
SEE AUXILLARY BOX LABEL
FOR FIELD MONITORED AND CONTROL OF FIRE MANAGEMENT, DISCONNECT BLU AND WHT WIRE FROM TB5-11 AND TB5-12
RETURN AIR SMOKE DETECTOR FIOP (IN AUX BOX)
REMOTE FIRE SHUTDOWN CONTACTS (FIELD WIRING)
ONLY ON GAS HEAT UNITS
RED JUMPER WIRE MUST BE ADDED BETWEEN R AND W1 FOR SPACE TEMPERATURE MODE AND TEMPORARILY DURING SERVICE TEST MODE WHEN THE HEATER NEEDS TO OPERATE
TB4
TB5
ALARM CONTACTS
FROM POWER SCHEMATIC
SEE CEM WIRING DIAGRAM
MODULATING GAS HEAT/TOP SEE STAGED GAS HEAT LABEL
INDUCED DRAFT MOTOR WIRING SEE GAS HEAT LABEL DIAGRAM
TO AUX BOX CCB2 FOR HOT GAS BYPASS
RETURN AIR IAQ FIOP SENSOR
ACC SPACE IAQ SENSOR
REMOTE ECONO POSITION 4-20 ma
FIELD SUPPLIED 24 VAC
NOTE: REMOVE RESISTOR WHEN USING REMOTE POT (1000)
SCTB
SCTA
SSTB
SSTA
OAT
EDT
RAT
FIOP/ACC FILTER STATUS
MAIN BASE BOARD (MBB)
AUXILLARY CONTROL BOX SCB1 & SCB2
SCROLLING MARQUEE DISPLAY SDU
SEE GAS OR ELECTRIC HEAT LABEL
T-55 ACCESSORY
T-56 ACCESSORY
CCN
LEN
CAN ONLY HAVE ONE
NOTE 1 - INTERNAL COMPRESSOR MOTOR PROTECTORS (IP) ARE ONLY USED ON THE MANEUROP COMPRESOORS IN THE FOLLOWING UNITS:
040 - COMPRESSOR B1 & B2
050 - COMPRESSOR A1, A2, B1, B2
060 - COMPRESSOR A1, A2, B1, B2
FOR ALL OTHER UNITS MBB RELAYS ARE WIRED DIRECTLY TO COMPRESSOR CONTACTOR.
NOTE 2 - COMPRESSOR B2 IS NOT USED ON THE 020, 025 & 027 UNITS.
NOTE 3 - HIR RELAY CONTACTS RATED FOR 1 AMP AT 115 VAC & 3 AMPS AT 24 VAC.
1/4 SPADE CONNECTORS
IFCA ONLY USED ON 40-060
THE 020-027 UNITS ONLY HAVE 3 COMPRESSORS AND DO NOT USE THE CCH-B2 CRANKCASE HEATERS

Fig. 1 — Typical Main Control Box Wiring Schematic

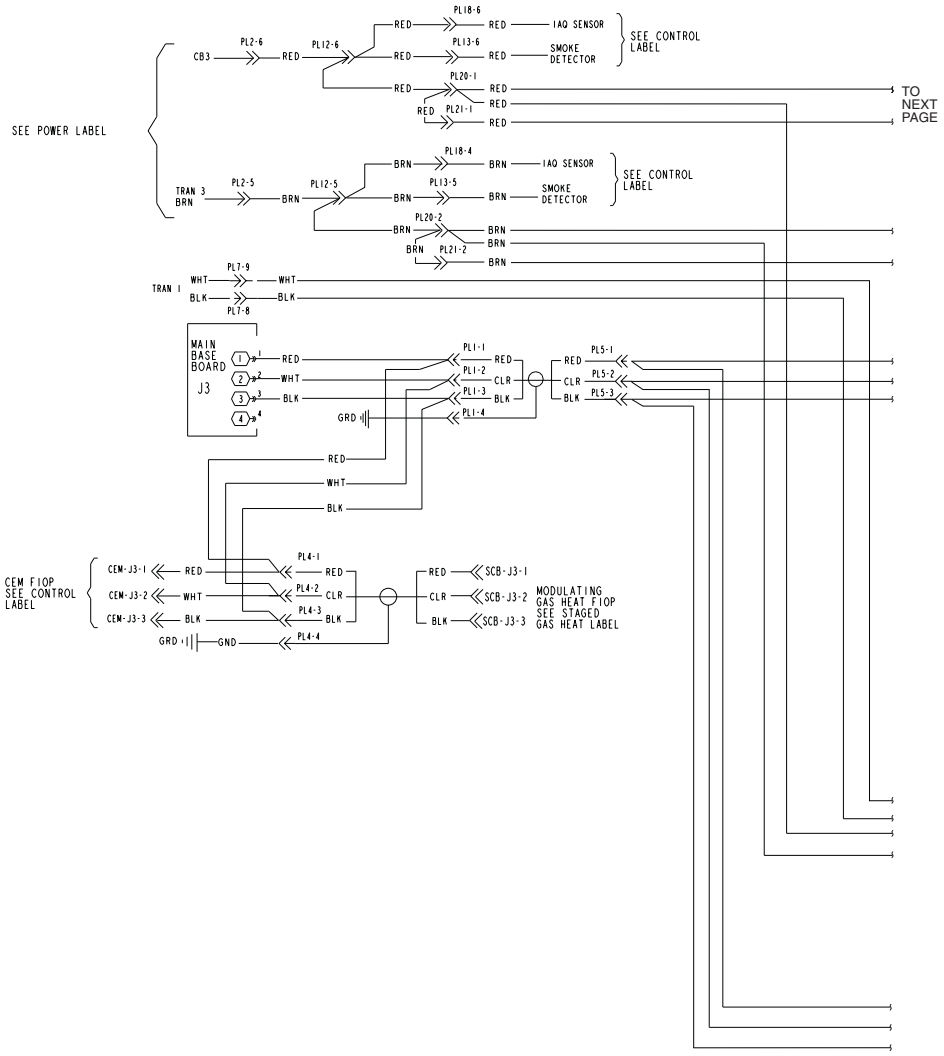


Fig. 2 — Auxiliary Control Box Wiring Schematic

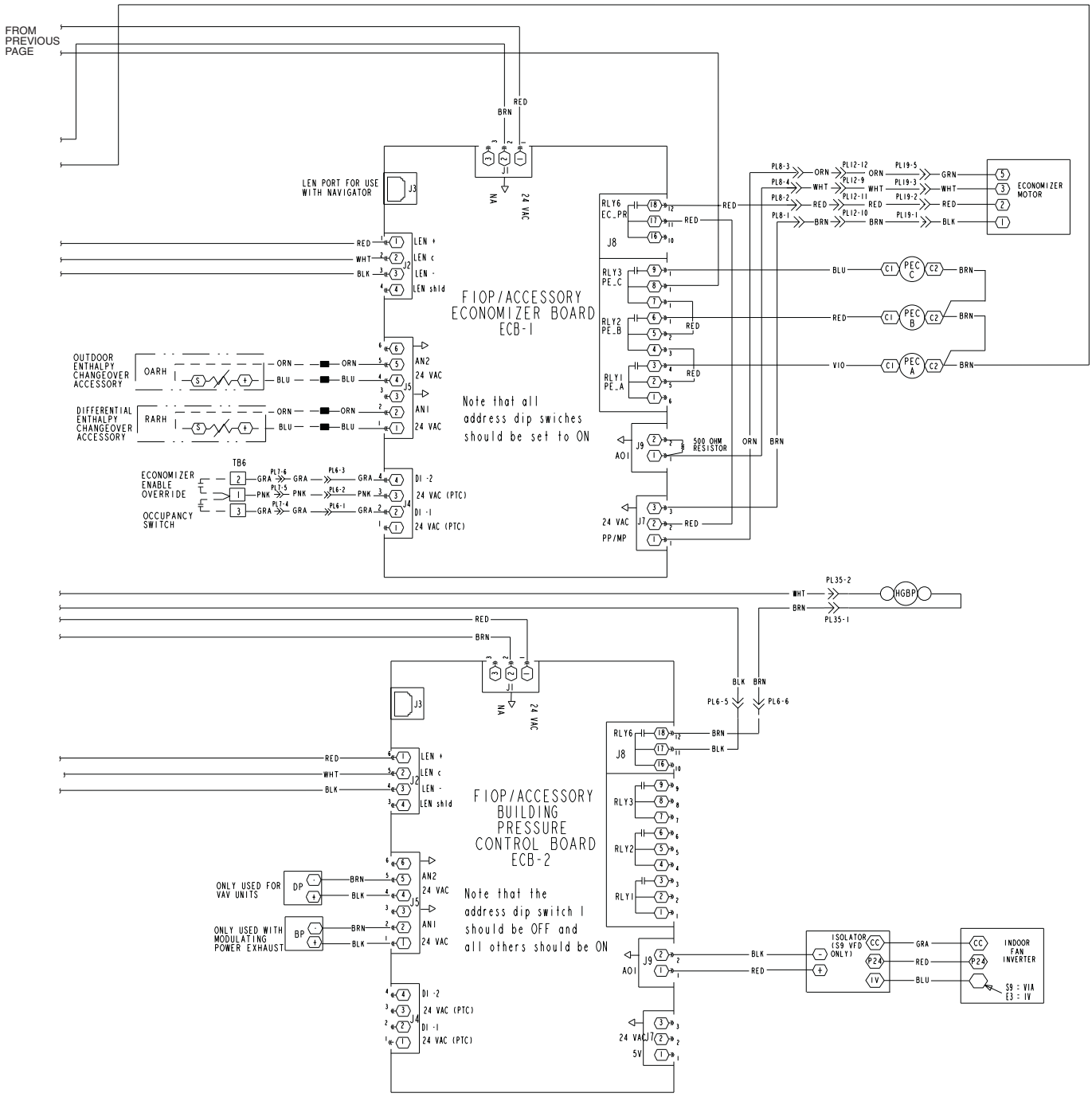

FROM PREVIOUS PAGE
FIOP/ACCESSORY ECONOMIZER BOARD ECB-1
Note that all address dip swiches should be set to ON
FIOP/ACCESSORY BUILDING PRESSURE CONTROL BOARD ECB-2
Note that the address dip switch 1 should be OFF and all others should be ON
LEN PORT FOR USE WITH NAVIGATOR
OUTDOOR ENTHALPY CHANGEOVER ACCESSORY
DIFFERENTIAL ENTHALPY CHANGEOVER ACCESSORY
ECONOMIZER ENABLE OVERRIDE
OCCUPANCY SWITCH
ONLY USED FOR VAV UNITS
ONLY USED WITH MODULATING POWER EXHAUST
ECONOMIZER MOTOR
INDOOR FAN INVERTER
HGBP
500 OHM RESISTOR
ISOLATOR (S9 VFD ONLY)

Fig. 2 — Auxiliary Control Box Wiring Schematic (cont)

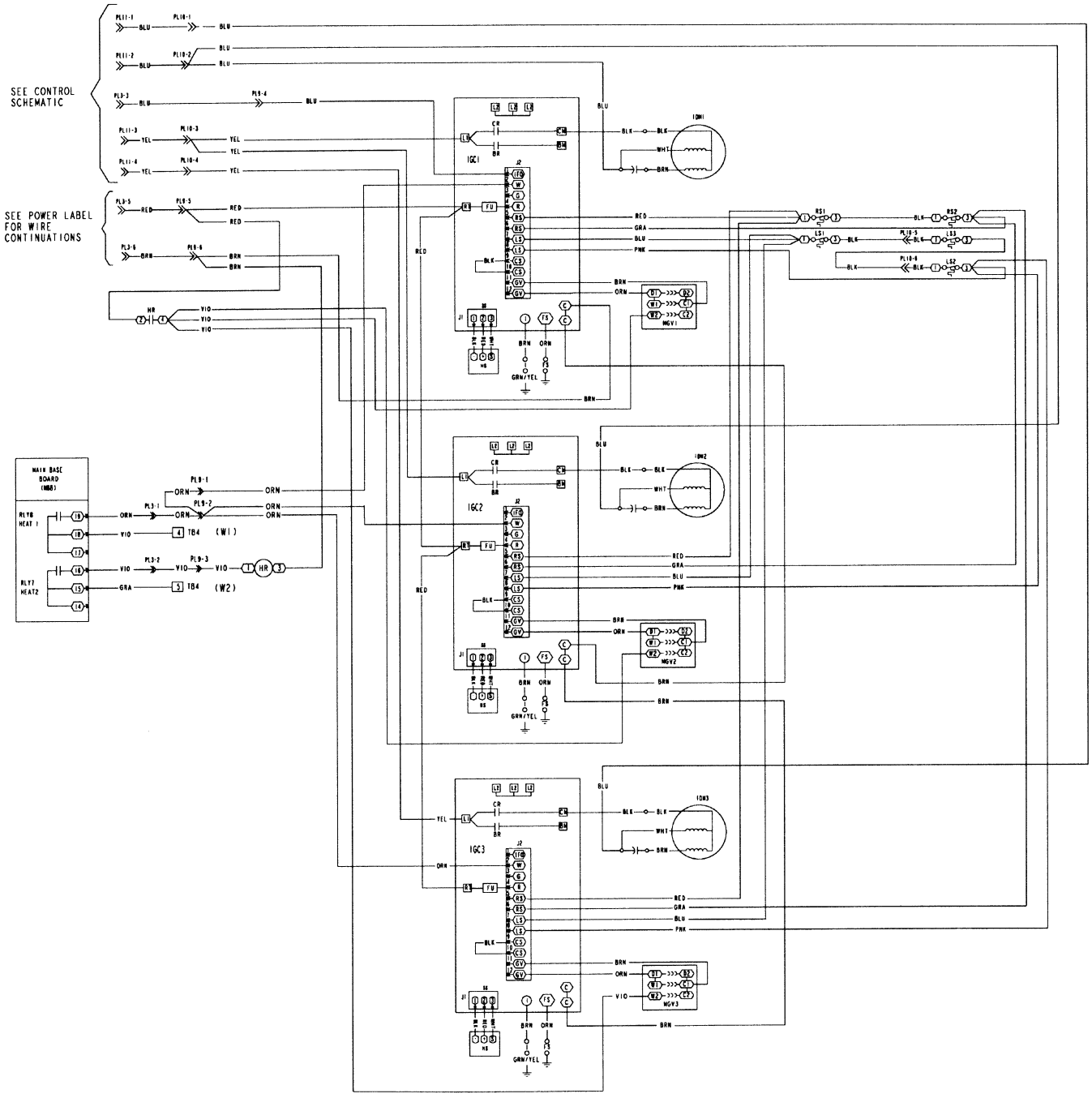


Fig. 3 — Typical 2 Stage Gas Heat Wiring Schematic (Size 060 Unit Shown)

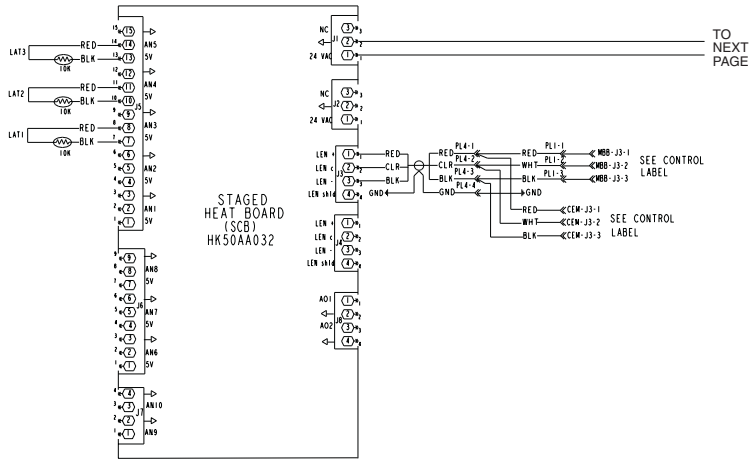


Fig. 4 — Typical Staged Gas Heat Wiring Schematic (Size 060 Unit Shown)

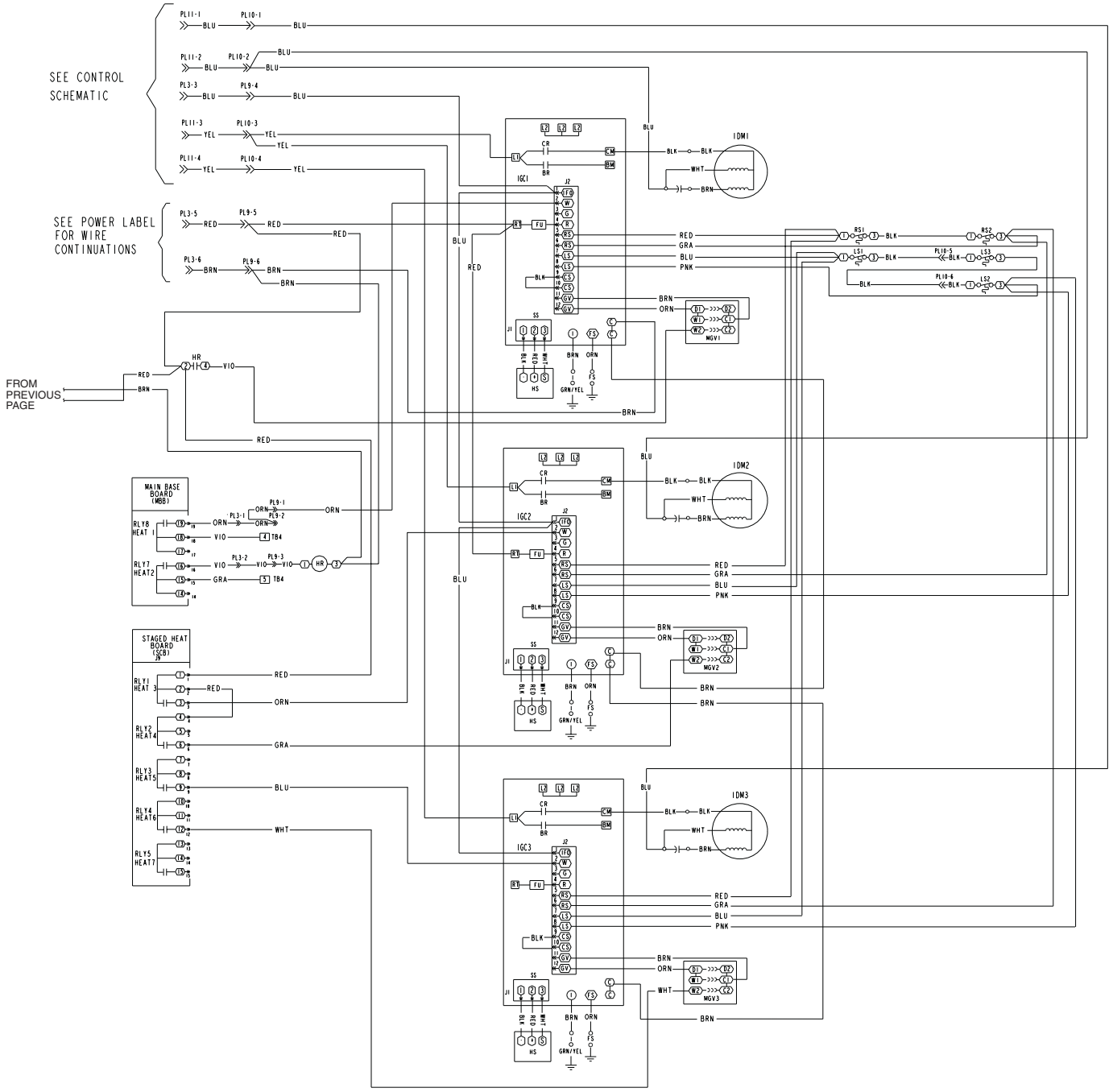


Fig. 4 — Typical Staged Gas Heat Wiring Schematic (Size 060 Unit Shown) (cont)

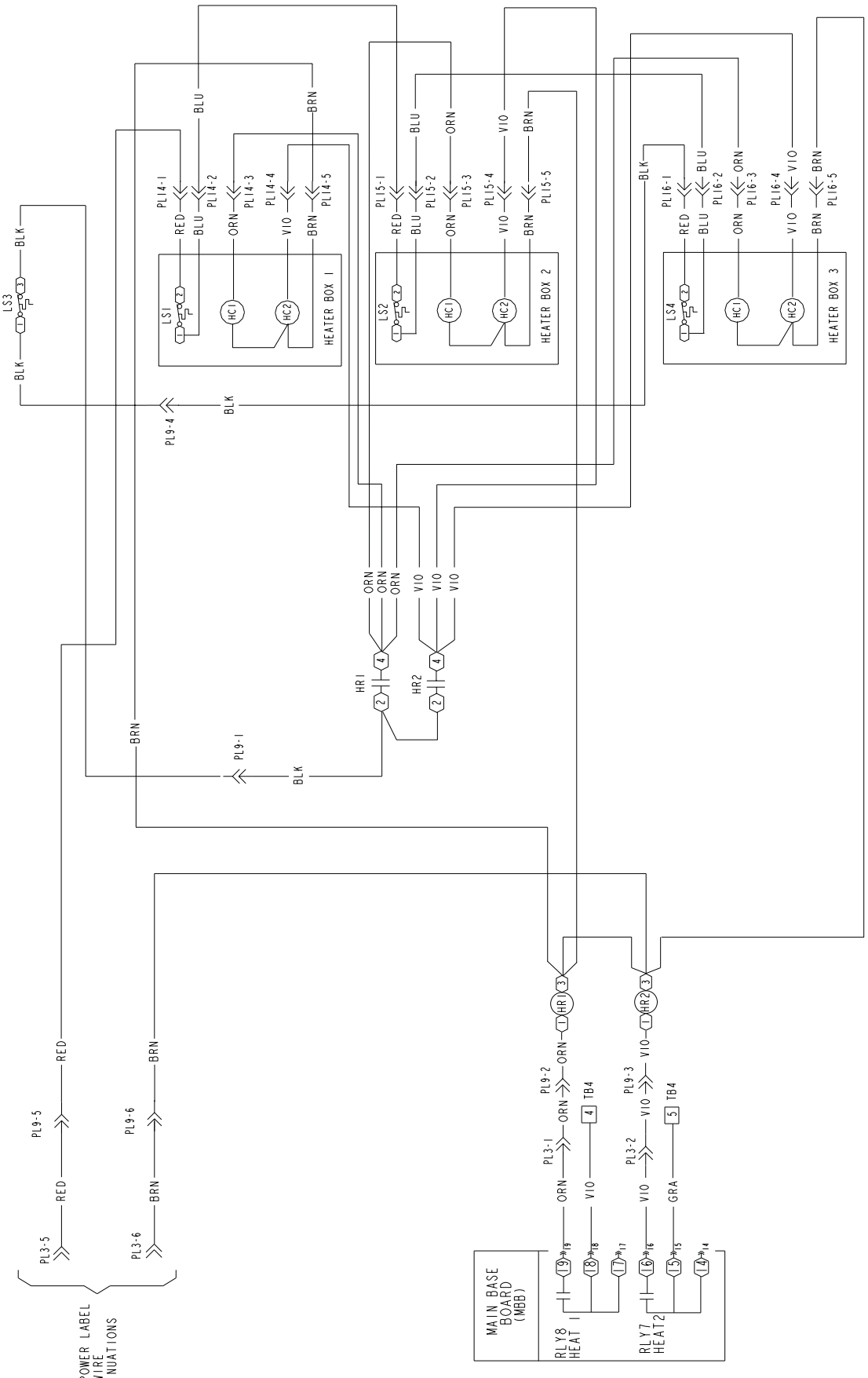
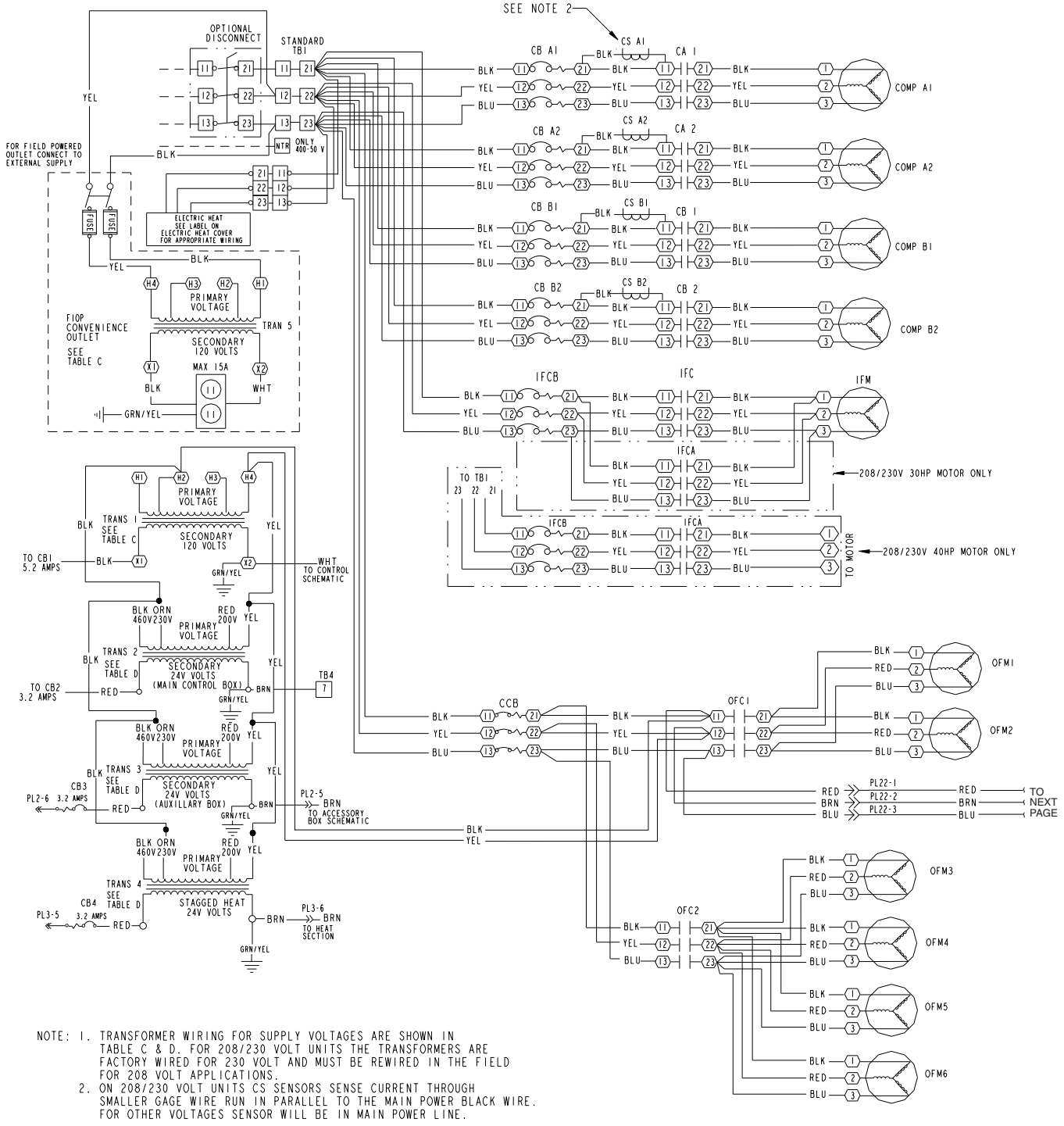


Fig. 5 — Typical Electric Heat Control Schematic — 50AJ,AK,AW,AY (Size 060 Shown)



NOTE: 1. TRANSFORMER WIRING FOR SUPPLY VOLTAGES ARE SHOWN IN TABLE C & D. FOR 208/230 VOLT UNITS THE TRANSFORMERS ARE FACTORY WIRED FOR 230 VOLT AND MUST BE REWIRED IN THE FIELD FOR 208 VOLT APPLICATIONS.
2. ON 208/230 VOLT UNITS CS SENSORS SENSE CURRENT THROUGH SMALLER GAGE WIRE RUN IN PARALLEL TO THE MAIN POWER BLACK WIRE. FOR OTHER VOLTAGES SENSOR WILL BE IN MAIN POWER LINE.

Fig. 6 — Typical Power Schematic (Size 060 Unit Shown)

TABLE C

208-230/460V TRANSFORMER	CONNECT
PRIMARY VOLTAGE: 460V	H1 (BLK)
230V	H2 (BLK)
208V	H3 (BLK)
COMM	H4 (YEL)
SECONDARY VOLTAGE 115V	X1 (BLK)
COMM	X2 (YEL)

575V TRANSFORMER	CONNECT
PRIMARY VOLTAGE: 575V	H1 (BLK)
COMM	H4 (YEL)
SECONDARY VOLTAGE 115V	X1 (BLK)
COMM	X3 (YEL)

400V TRANSFORMER	CONNECT
PRIMARY VOLTAGE: 400V	
380V	H2 (BLK)
	H3 (BLK)
COMM	H4 (YEL)
SECONDARY VOLTAGE 115V	X1 (BLK)
	X2-X4
	X1-X3
COMM	X4 (YEL)

TABLE D

208-230/460V TRANSFORMER	CONNECT
PRIMARY VOLTAGE: 460V	BLK
230V	ORN
208V	RED
COMM	YEL
SECONDARY VOLTAGE 24V	X1 (BLK)
COMM	X2 (YEL)

575V TRANSFORMER	CONNECT
PRIMARY VOLTAGE: 575V	BLK
COMM	YEL
SECONDARY VOLTAGE 24V	X1 (BLK)
COMM	X3 (YEL)

400V TRANSFORMER	CONNECT
PRIMARY VOLTAGE: 400V	
380V	BLK
COMM	YEL
SECONDARY VOLTAGE 24V	X1 (BLK)
COMM	X4 (YEL)

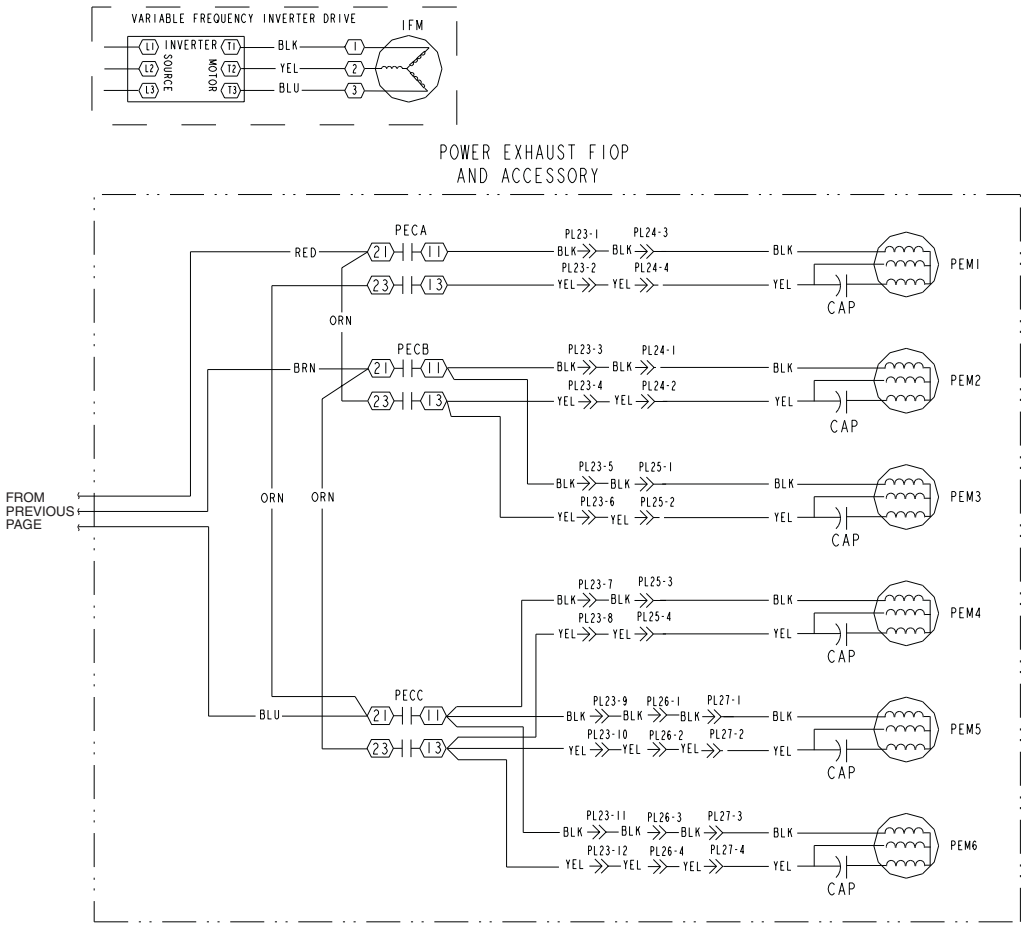


Fig. 6 — Typical Power Schematic (Size 060 Unit Shown) (cont)

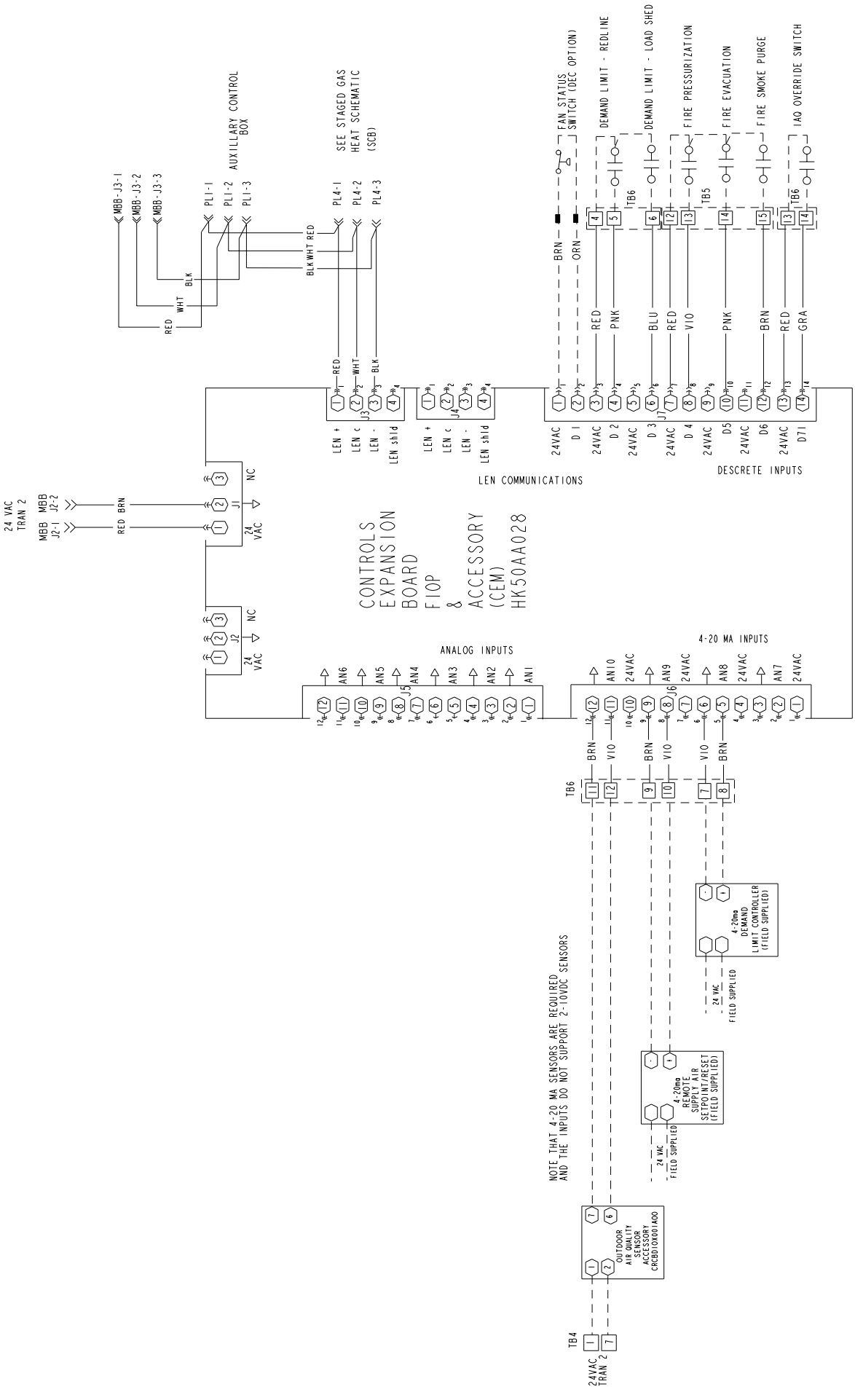


Fig. 7 — Controls Option Wiring Schematic

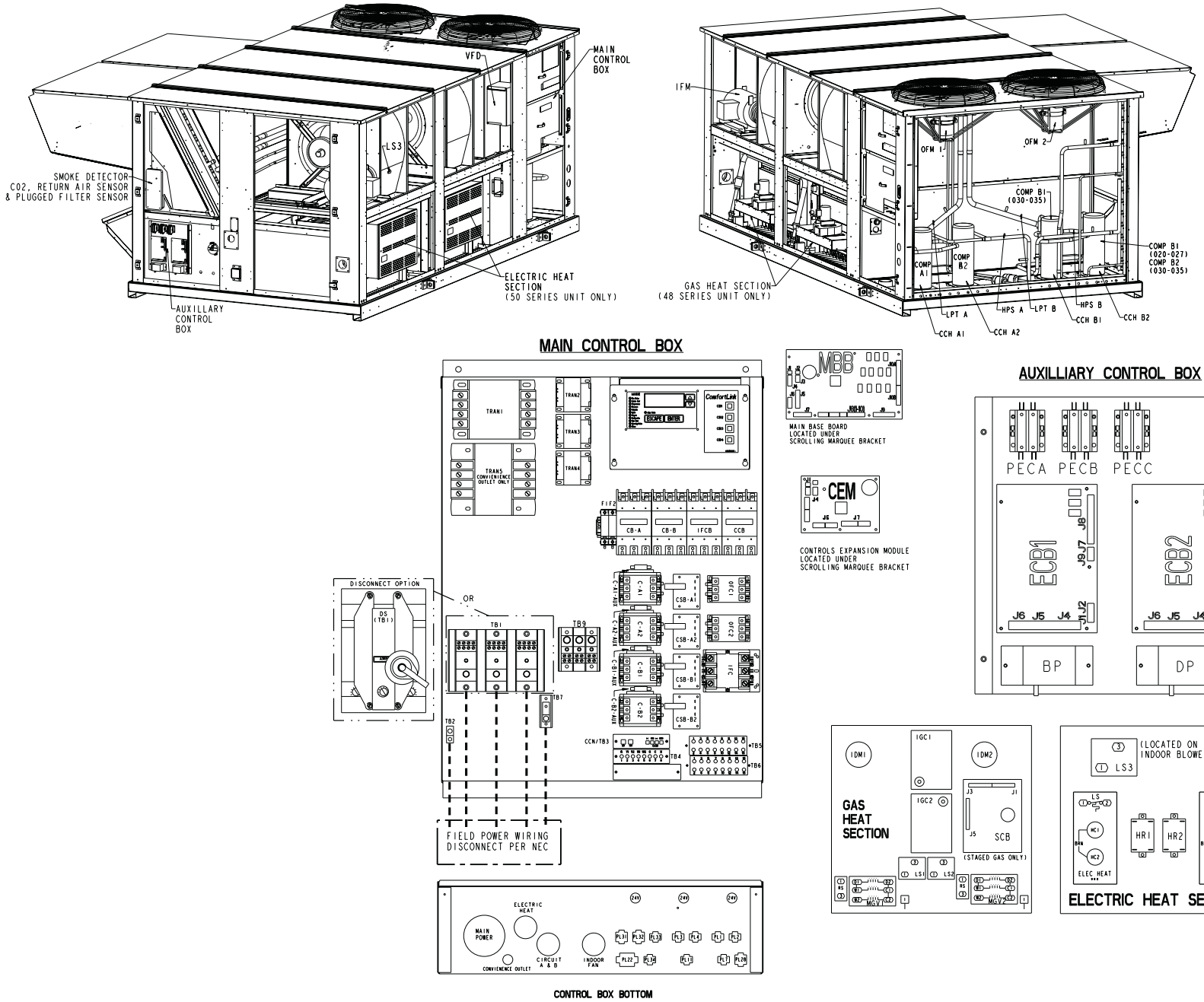


Fig. 8 — Small Chassis Component Location (Size 020-035 Units)

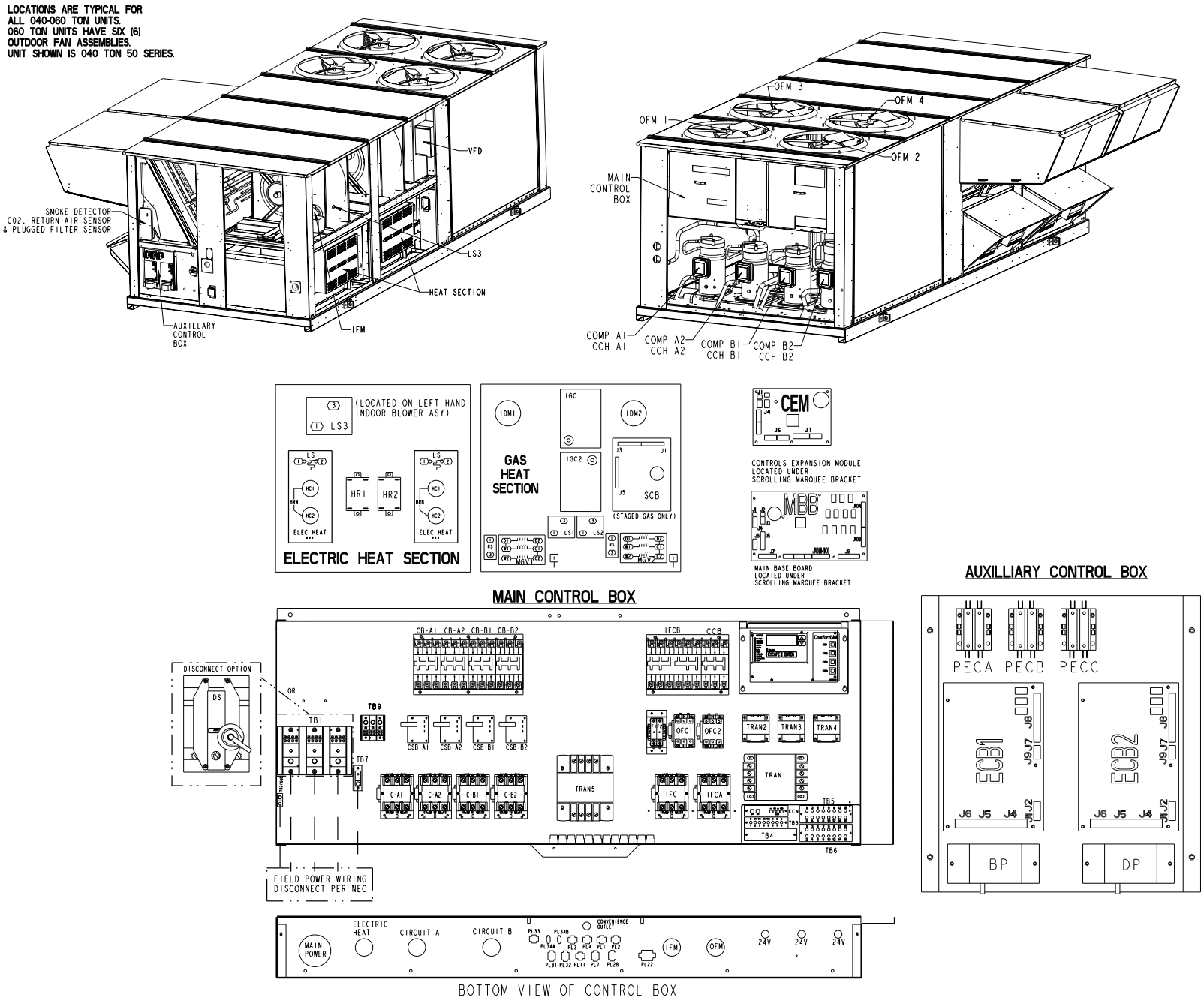


Fig. 9 — Large Chassis Component Locations (Size 040-060 Units)

LEGEND AND NOTES FOR FIG. 1-9

LEGEND

A — Circuit A
AUX — Auxiliary Contact
B — Circuit B
BP — Building Pressure Transducer
C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CCB — Control Circuit Breaker
CCH — Crankcase Heater
CCN — Carrier Comfort Network
CEM — Controls Expansion Module
COMP — Compressor Motor
CR — Control Relay
CS — Compressor Safety
CSB — Compressor Current Sensing Board
CV — Constant Volume
DP — Duct Pressure Sensor
DS — Disconnect Switch
ECB-1 — Economizer Control Board
ECB-2 — Building and Supplier Air Control Board
ECM — Economizer Motor
EDT — Evaporator Discharge Air Temperature
EQUIP — Equipment
FIOP — Factory-Installed Option
FS — Flame Sensor
FU — Fuse
GND — Ground
GVR — Gas Valve Relay
HC — Heat Contactor
HGBP — Hot Gas Bypass
HIR — Heat Interlock Relay
HPS — High Pressure Switch
HR — Heat Relay
HS — Hall Effect Induced Draft Motor Switch
I — Ignitor
IDM — Induced Draft Motor
IFC — Indoor Fan Contactor
IFCB — Indoor Fan Circuit Breaker
IFM — Indoor Fan Motor
IFR — Indoor Fan Relay
IGC — Integrated Gas Control Board
IP — Internal Compressor Protector
LAT — Staged Gas Temperature Sensor
LEN — Local Equipment Network
LS — Limit Switch
MBB — Main Base Board
MGV — Main Gas Valve
OARH — Outdoor Air Relative Humidity
OAT — Outdoor Air Temperature Sensor
OFC — Outdoor Fan Contactor
OFM — Outdoor Fan Motor
OIAQ — Outdoor IAQ Sensor
PEC — Power Exhaust Contactor
PEM — Power Exhaust Motor
PL — Plug
QC — Quick Connect
RARH — Return Air Relative Humidity
RAT — Return Air Temperature Sensor
RIAQ — Return Air IAQ Sensor
RLY — Relay
RS — Rollout Switch
SCB — Staged Gas Heat Control Board
SCT — Saturated Condensing Temperature Sensor
SDU — Scroll Marquee Display
SIAQ — Space IAQ Sensor
SSP — Saturated Suction Pressure
SST — Saturated Suction Temperature Sensor
T-55 — Room Temperature Sensor
T-56 — Room Temperature Sensor with Setpoint
TB — Terminal Block
TRAN — Transformer
VAV — Variable Air Volume
VFD — Variable Frequency Drive

Terminal Block

Terminal (Unmarked)

Terminal (Marked)

Splice

Factory Wiring

Field Wiring

To indicate common potential only.
Not to represent wiring.

To Indicate FIOP or Accessory

THERMOSTAT MARKINGS

BM — Blower Motor
C — Common
CM — Inducer Motor
CS — Centrifugal Switch
G — Fan
IFO — Indoor Fan On
L1 — Line 1
R — Thermostat Power
RT — Power Supply
SS — Speed Sensor
W1 — Thermostat Heat Stage 1
W2 — Thermostat Heat Stage 2
X — Alarm Output
Y1 — Thermostat Cooling Stage 1
Y2 — Thermostat Cooling Stage 2

NOTES:
1. Factory wiring is in accordance with the National Electrical Codes. Any field modifications or additions must be in compliance with all applicable codes.
2. Use 75° C min wire for field power supply, use copper wires for all units.
3. All circuit breakers “Must Trip Amps” are equal to or less than 156% RLA.
4. Compressor and fan motors are thermally protected — three phase motors protected against primary single phase conditions.
5. Red jumper wire must be added between R, W1, and W2 for space temperature sensor and all VAV units with heat and temporarily during service-test mode when the heaters need to operate.

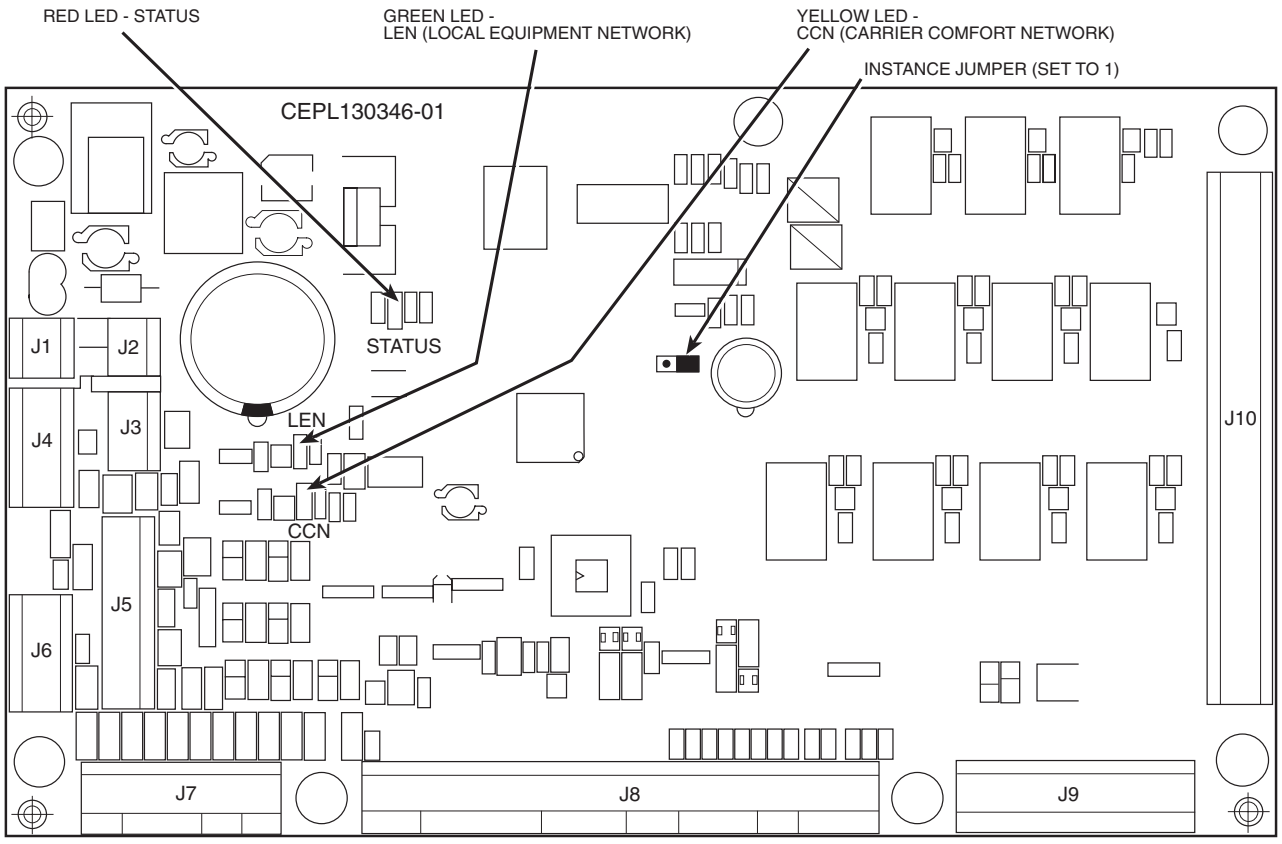


Fig. 10 — Main Base Board (MBB)

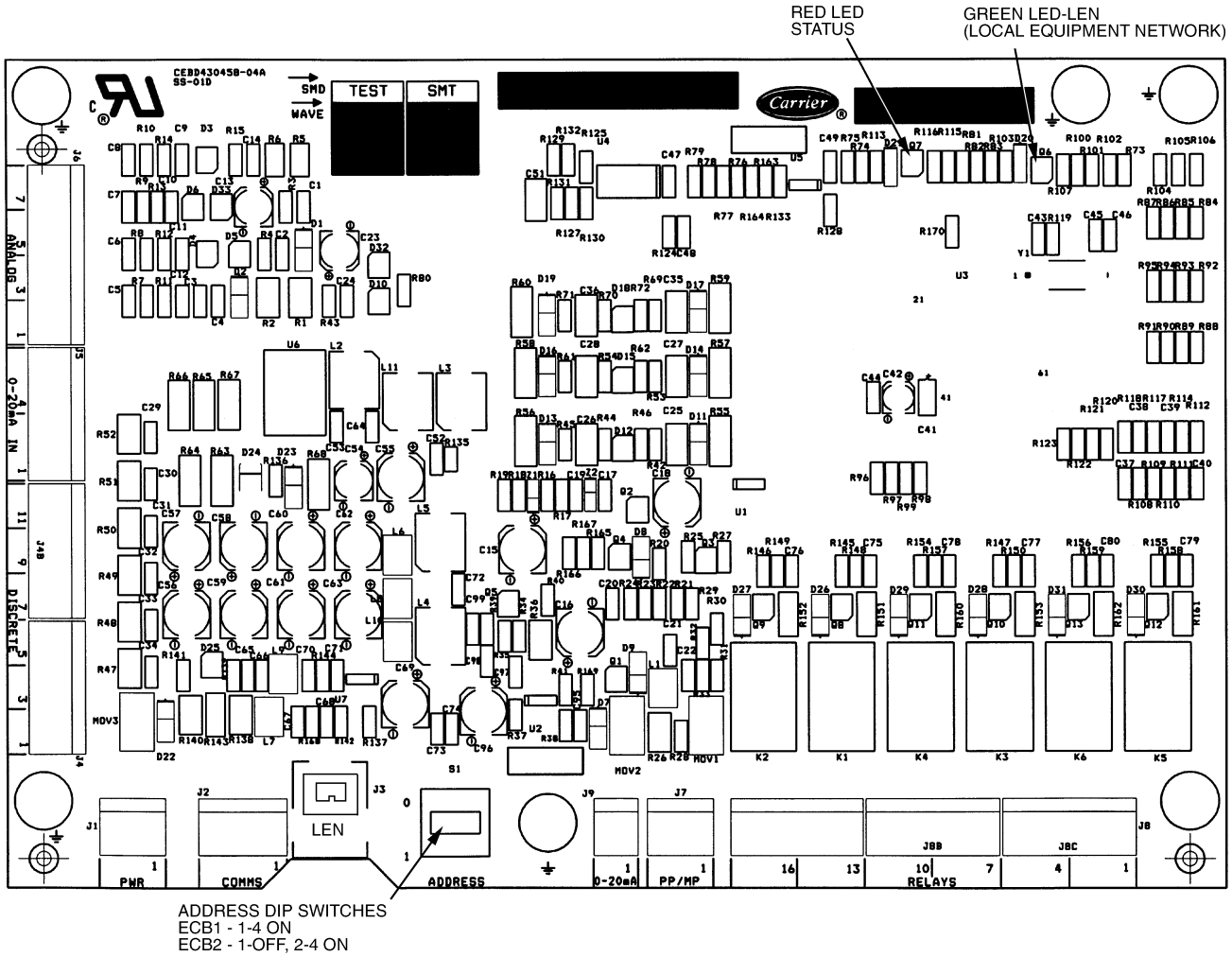


Fig. 11 — Economizer Control Board (ECB1) and VAV Control Board (ECB2)

Table 2 — MBB Channel Assignments

POINT NAME	POINT DESCRIPTION	TYPE OF I/O	I/O POINT NAME	CONNECTOR PIN NO.
INPUTS				
GAS.S	YAC Indoor Fan Relay (Fan Request from YAC)	Switch Input	DI1	J6, 3-4
FDWN	Fire Shutdown Switch Input	Switch Input	DI2	J6, 5-6
G	Thermostat 'G' Input / Remote Occupied	Switch Input	DI3	J7, 1-2
W2	Thermostat 'W2' Input	Switch Input	DI4	J7, 3-4
W1	Thermostat 'W1' Input	Switch Input	DI5	J7, 5-6
Y2	Thermostat 'Y2' Input	Switch Input	DI6	J7, 7-8
Y1	Thermostat 'Y1' Input	Switch Input	DI7	J7, 9-10
CS.A1	Compressor A1 Current Sensor	Digital Input	DIG1	J9, 10-12
CS.A2	Compressor A2 Current Sensor	Digital Input	DIG2	J9, 7-9
CS.B1	Compressor B1 Current Sensor	Digital Input	DIG3	J9, 4-6
CS.B2	Compressor B2 Current Sensor	Digital Input	DIG4	J9, 1-3
SCT.A	Circuit A Saturated Condensing Temperature	5 K Thermistor	AN1	J8, 21-22
SCT.B	Circuit B Saturated Condensing Temperature	5 K Thermistor	AN2	J8, 24-24
SST.A	Circuit A Saturated Suction Pressure	Press Transducer	AN3	J8, 15-17
SST.B	Circuit B Saturated Suction Pressure	Press Transducer	AN4	J8, 18-20
RAT	Return Air Temperature	10K Thermistor	AN5	J8, 9-10
EDT	Evaporator Discharge Air Temperature	10K Thermistor	AN6	J8, 11-12
OAT	Outdoor Air Temperature	10K Thermistor	AN7	J8, 13-14
SPT	Space Temperature (T55/56)	10K Thermistor	AN8	J8, 1-2
SPTO	Space Temperature Offset (T56)	10K Thermistor	AN9	J8, 3-4
IAQ, IAQ.R, ECO.P	IAQ Analog Input	4-20 mA	AN10	J8, 5-6
FIL.S	Filter Status	Switch Input	AN11	J8, 7-8
OUTPUTS				
B2	Compressor B2	Relay	RLY 1	J10, 20-21
B1	Compressor B1	Relay	RLY 2	J10, 22-23
A2	Compressor A2	Relay	RLY 3	J10, 24-25
A1	Compressor A1	Relay	RLY 4	J10, 26-27
OFC.B	Condenser Fan B	Relay	RLY 5	J10, 10-11
OFC.A	Condenser Fan A	Relay	RLY 6	J10, 12-13
HS.2	Heat Stage 2	Relay	RLY7	J10, 14-16
HS.1	Heat Stage 1	Relay	RLY 8	J10, 17-19
HIR	Heat Interlock Relay	Relay	RLY 9	J10, 4-6
S.FAN	Supply Fan	Relay	RLY 10	J10, 7-9
ALR	Alarm Output Relay	Relay	RLY 11	J10, 1-3

LEGEND

YAC — Gas Heat Unit (48A)

Table 3 — ECB1 Channel Assignments

POINT NAME	POINT DESCRIPTION	I/O TYPE	I/O POINT NAME	CONNECTOR PIN NO.
INPUTS				
RE.MT	Remote Occupancy	Switch	DI1	J4, 1-2
E.ENA	Economizer Enable	Switch	DI2	J4, 3-4
RA.RH	Return Air Relative Humidity	4-20 mA	AN1	J5, 1-3
OA.RH	Outdoor Air Relative Humidity	4-20 mA	AN2	J5, 4-6
OUTPUTS				
EC.AP	Economizer Actuator (Analog Control)	4-20 mA	AO1	J9, 1-2
EC.AP	Economizer Actuator (Digital Control)	Digital	PP/MP	J7, 1-3
PE.A	Power Exhaust Stage A	Relay	RLY1	J8, 1-3
PE.B	Power Exhaust Stage B	Relay	RLY 2	J8, 4-6
PE.C	Power Exhaust Stage C	Relay	RLY 3	J8, 7-9
E.PWR	Economizer Power	Relay	RLY 6	J8, 16-18

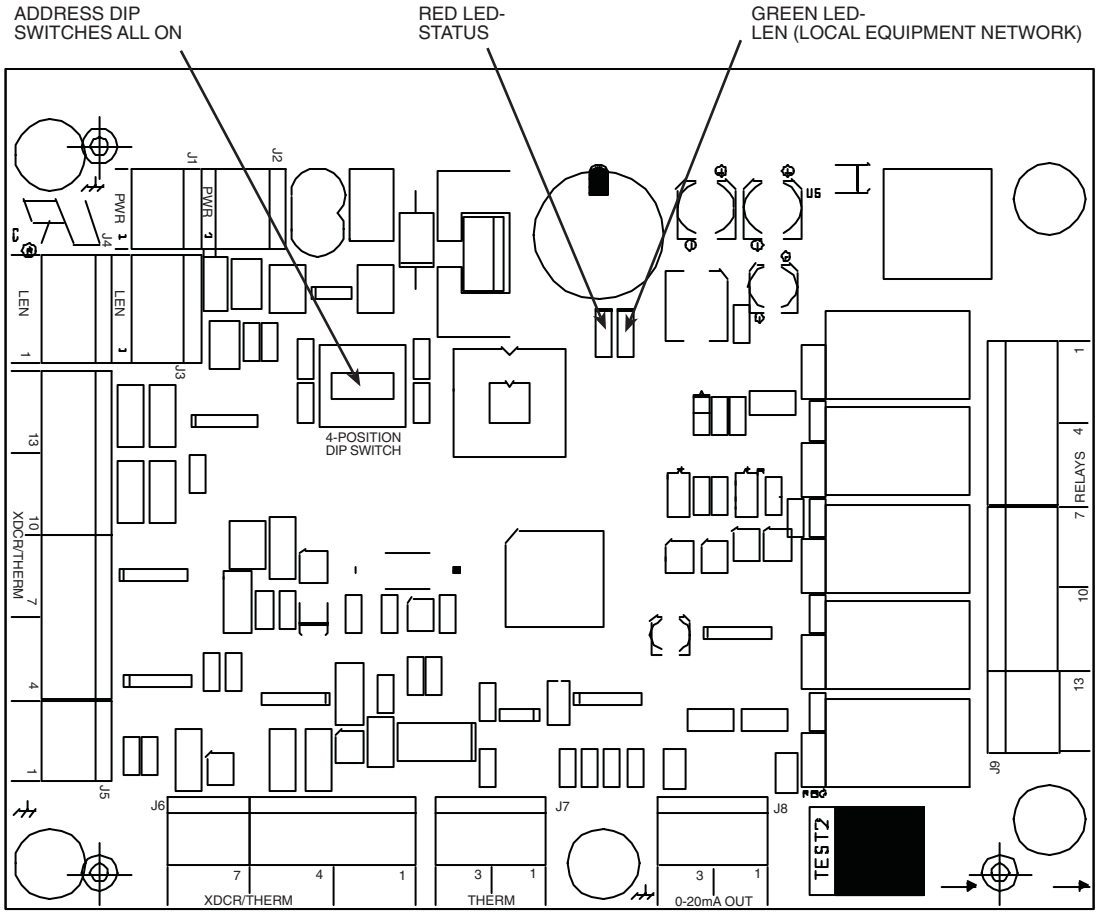


Fig. 12 — Staged Gas Heat Control Board (SCB)

Table 4 — ECB2 Channel Assignments

POINT NAME	POINT DESCRIPTION	I/O TYPE	I/O POINT NAME	CONNECTOR PIN NO.
INPUTS				
—	Not Used		DI1	J4, 1-2
—	Not Used		DI2	J4, 3-4
BLDG	Building Static Pressure	4-20 mA	AN1	J5, 1-3
DUCT	Supply Duct Static Pressure	4-20 mA	AN2	J5, 4-6
OUTPUTS				
S.VFD	Supply Fan Inverter Speed	4-20 mA	AO1	J9, 1-2
—	Not Used		PP/MP	J7, 1-3
—	Not Used		RLY1	J8, 1-3
—	Not Used		RLY 2	J8, 4-6
—	Not Used		RLY 3	J8, 7-9
MLV	Minimum Load Valve (Hot Gas Bypass)	Relay	RLY 6	J8, 16-18

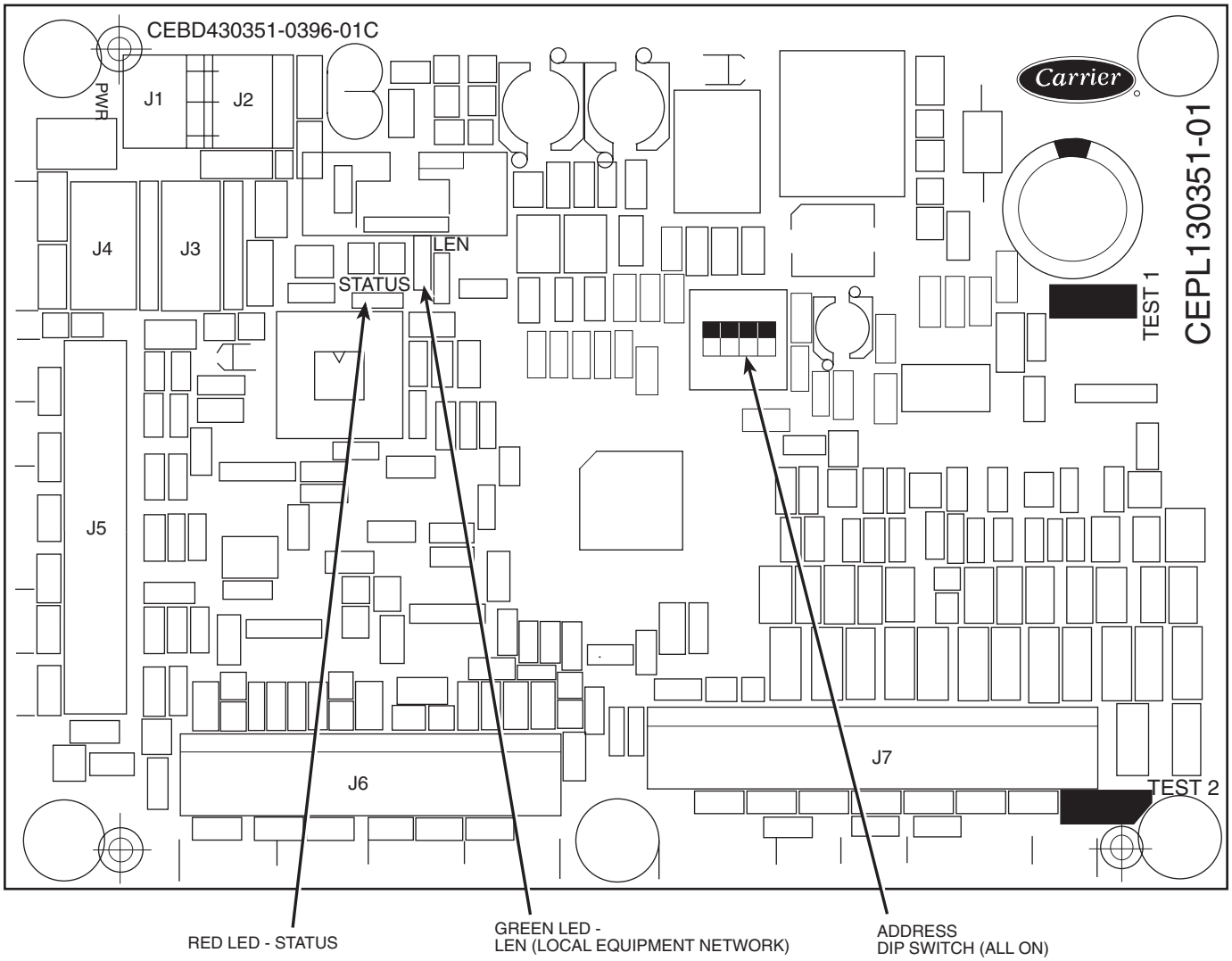


Fig. 13 — Controls Expansion Board (CEM)

Table 5 — SCB Channel Assignments

POINT NAME	POINT DESCRIPTION	I/O TYPE	I/O POINT NAME	CONNECTOR PIN NO.
INPUTS				
—	Not Used		AN1	J5, 1-3
—	Not Used		AN2	J5, 4-6
LAT.1	Supply Air Temperature 1	10K thermistor	AN3	J5, 7-9
LAT.2	Supply Air Temperature 2	10K thermistor	AN4	J5, 10-12
LAT.3	Supply Air Temperature 3	10K thermistor	AN5	J5, 13-15
—	Not Used	—	AN6	J6, 1-3
—	Not Used	—	AN7	J6, 4-6
—	Not Used	—	AN8	J6, 7-9
—	Not Used	—	AN9	J7, 1-2
—	Not Used	—	AN10	J7, 3-4
OUTPUTS				
—	Not Used	—	AO1	J8, 1-2
—	Not Used	—	AO2	J8, 3-4
HS.3	Heat Stage 3	Relay	RLY1	J9, 1-3
HS.4	Heat Stage 4	Relay	RLY 2	J9, 4-6
HS.5	Heat Stage 5	Relay	RLY 3	J9, 7-9
HS.6	Heat Stage 6	Relay	RLY 4	J9, 10-12
—	Not Used	Relay	RLY 5	J9, 13-15

Table 6 — CEM Channel Assignments

POINT NAME	POINT DESCRIPTION	TYPE OF I/O	I/O POINT NAME	CONNECTOR PIN NO.
INPUTS				
FAN.S	Supply Fan Status switch	Switch	DI 1	J7, 1-2
DLM.1	Demand Limit — Redline	Switch	DI 2	J7, 3-4
DLM.2	Demand Limit — Load Shed	Switch	DI 3	J7, 5-6
F.PRS	Fire Pressurization	Switch	DI 4	J7, 7-8
F.EVC	Fire Evacuation	Switch	DI 5	J7, 9-10
F.PRG	Smoke Purge	Switch	DI 6	J7, 11-12
IAQ	Indoor Air Quality Override Switch	Switch	DI 7	J7, 13-14
	Not Used at this Time	4-20 mA	AN7	J6, 1-3
DM.AI	4-20mA Demand Limit	4-20 mA	AN8	J6, 4-6
rm.sp	4-20mA Supply Air Setpoint	4-20 mA	AN9	J6, 7-9
OAQ	Outside Air CO_2 Sensor	4-20 mA	AN10	J6, 10-12
—	Not Used	—	AN1	J5, 1-2
—	Not Used	—	AN2	J5, 3-4
—	Not Used	—	AN3	J5, 5-6
—	Not Used	—	AN4	J5, 7-8
—	Not Used	—	AN5	J5, 9-10
—	Not Used	—	AN6	J5, 11-12

Table 7 — IGC Board Inputs and Outputs

POINT NAME	POINT DESCRIPTION	CONNECTOR PIN NO.
INPUTS		
RT	24 Volt Power Supply	R1,C
W	Heat Demand	2
G	Fan	3
LS	Limit Switch	7,8
RS	Rollout Switch	5,6
SS	Hall Effect Sensor	1,2,3
CS	Centrifugal Switch (Not Used)	9,10
FS	Flame Sense	FS
OUTPUTS		
CM	Induced Draft Motor	CM
IFO	Indoor Fan	IFO
R	24 Volt Power Output (Not Used)	R
SPARK	Sparker	—
LED	Display LED	

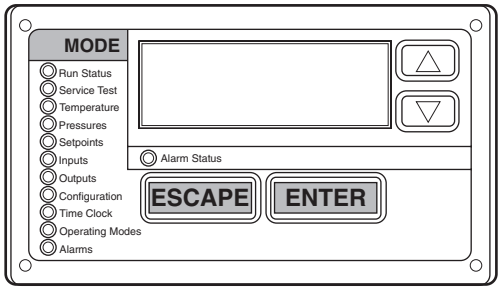


Fig. 14 — Scrolling Marquee

FIELD CONNECTION TERMINAL STRIPS — Field connection terminal strips are located in the main control box. See Fig. 17 and Table 10.

Accessory Control Components — In addition to the factory-installed options, the units can also be equipped with several field-installed accessories that expand the control features of the unit. The following hardware components can be used as accessories.

ROOM THERMOSTATS (48/50AJ,AW ONLY) — The *Comfort*Link™ Controls support a conventional electromechanical or electronic thermostat that uses the Y1, Y2, W1, W2, and G signals. The control also supports an additional input for an occupied/unoccupied command that is available on some new thermostats. The *Comfort*Link control can be configured to run with multiple stages of capacity which allows up to 6 stages of capacity. Although the unit can be configured for normal 2-stage control, it is recommended that the multi-stage control be used. The room thermostat is connected to TB4.

SPACE SENSOR — The *Comfort*Link control supports the use of space temperature sensors. The T55 and T56 sensors and CCN communicating T58 room sensor can be used. The T55 and T56 sensors are connected to TB5 terminal 3, 4, and 5. The T58 sensor is connected to the CCN connections on TB3. When a T55, T56, or T58 sensor is used, the user must install the red jumpers from R to W1, and W2 on TB4 for the heat function to work correctly.

SPACE CO_2 SENSORS — The *Comfort*Link control also supports a CO_2 IAQ sensor that can be located in the space for use in demand ventilation. The sensor must be a 4 to 20 mA sensor and should be connected to TB5 terminal 6 and 7. See Fig. 18 for sensor wiring.

ECONOMIZER HUMIDITY CHANGEOVER SENSORS — The *Comfort*Link controls support 5 different changeover schemes for the economizer. These are:

- Outdoor Air Dry Bulb
- Differential Dry Bulb
- Outdoor Air Enthalpy Curves
- Differential Enthalpy
- Custom Curves (a combination of an enthalpy/dewpoint curve and a dry bulb curve).

The units are equipped as standard with an outside air and return air dry bulb sensor which supports the dry bulb changeover methods. If the other methods are to be used, then a field-installed humidity sensor must be installed for outdoor air enthalpy and customer curve control and two humidity sensors must be installed for differential enthalpy. Installation holes are pre-drilled and wire harnesses are installed in every unit for connection of the humidity sensors. The *Comfort*Link Control converts the measured humidity into enthalpy, dewpoint, and the humidity changeover curves.

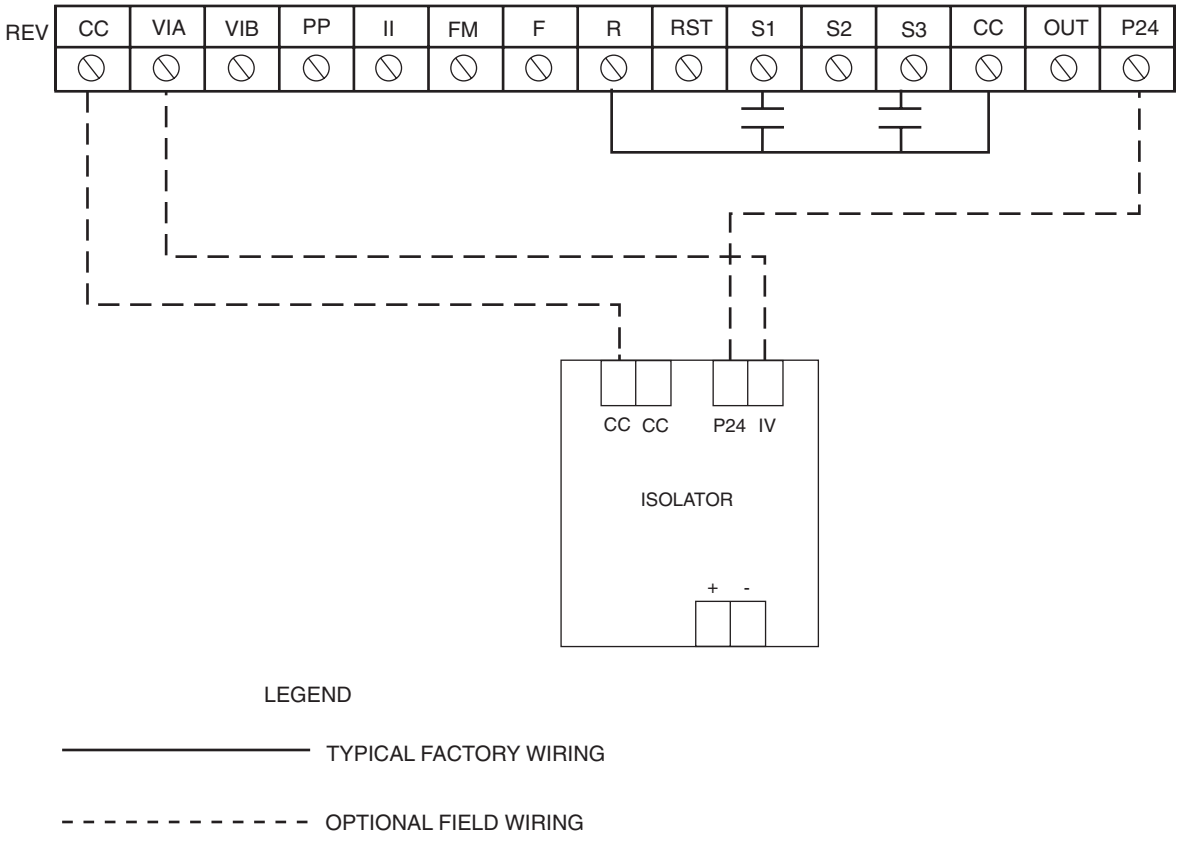


Fig. 15 — VFD (S9 Inverter) Interface Wiring and Jumpers

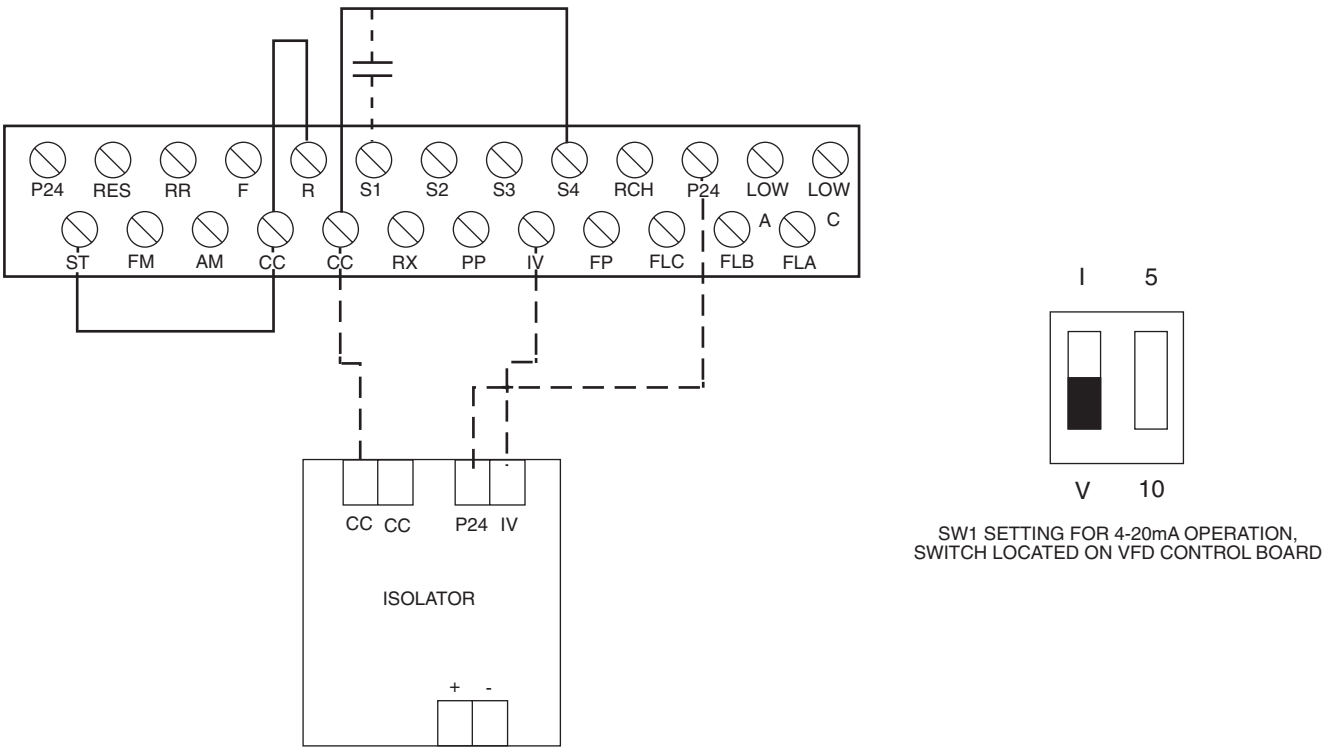


Fig. 16 — VFD (E3 Inverter) DISP Switch, Jumper and Interface Wiring

Table 8 — VFD (S9 Inverter) Terminal Designations

TERMINAL	FUNCTION
L1 (R) L2(S) L3(T)	Three-Phase Main Circuit Input Power Supply.
T1(U) T2(V) T3(W)	Three-Phase AC Output to Motor 0 V to Maximum Input Voltage Level
R C	Configured to auto start motor in the reverse direction as required by fan/motor configuration.
II (+) CC(–)	Not used for the A series.
P24 (+) II (–)	Factory set for 4-20 mA input from the ECB2 board through the isolator board.
S3 CC(–)	Not Used for the A Series.
S2 CC(–)	Not Used for the A Series.
SI CC(–)	Not Used for the A Series.

Table 9 — VFD (E3 Inverter) Terminal Designations

TERMINAL	FUNCTION
L1 (R) L2(S) L3(T)	Three-Phase Main Circuit Input Power Supply.
T1(U) T2(V) T3(W)	Three-Phase AC Output to Motor 0 V to Maximum Input Voltage Level
CC ST	Inverter Enable Factory-Supplied jumper cross CC& ST.
R CC	Configured to auto start motor in the reverse direction as required by fan/motor configuration.
S4 CC	Factory supplied jumper. When opened the drive goes to emergency stop.
S1 CC	Not used for the A series.
P24 IV	Factory wired for 4-20 mA remote input from ECB2 board through the isolation board.

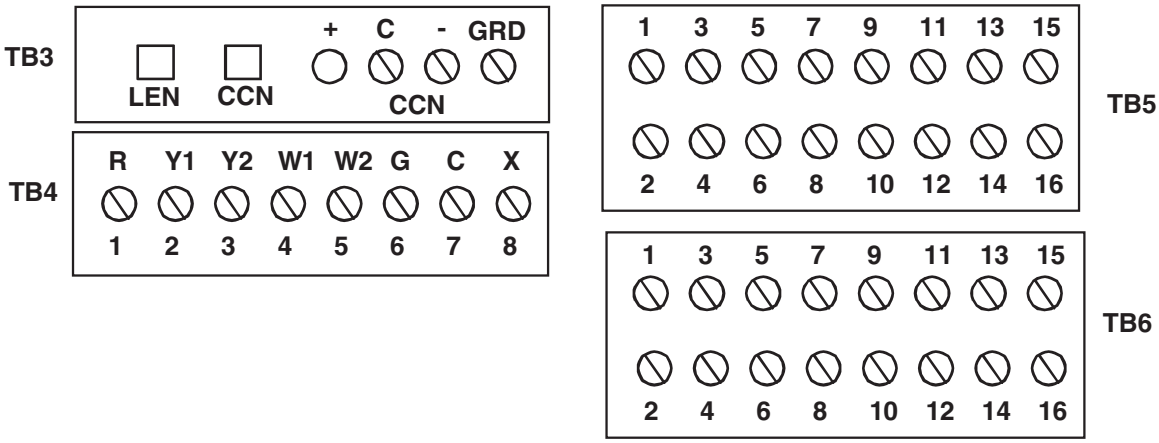


Fig. 17 — Field Connection Terminal Strips (Main Control Box)

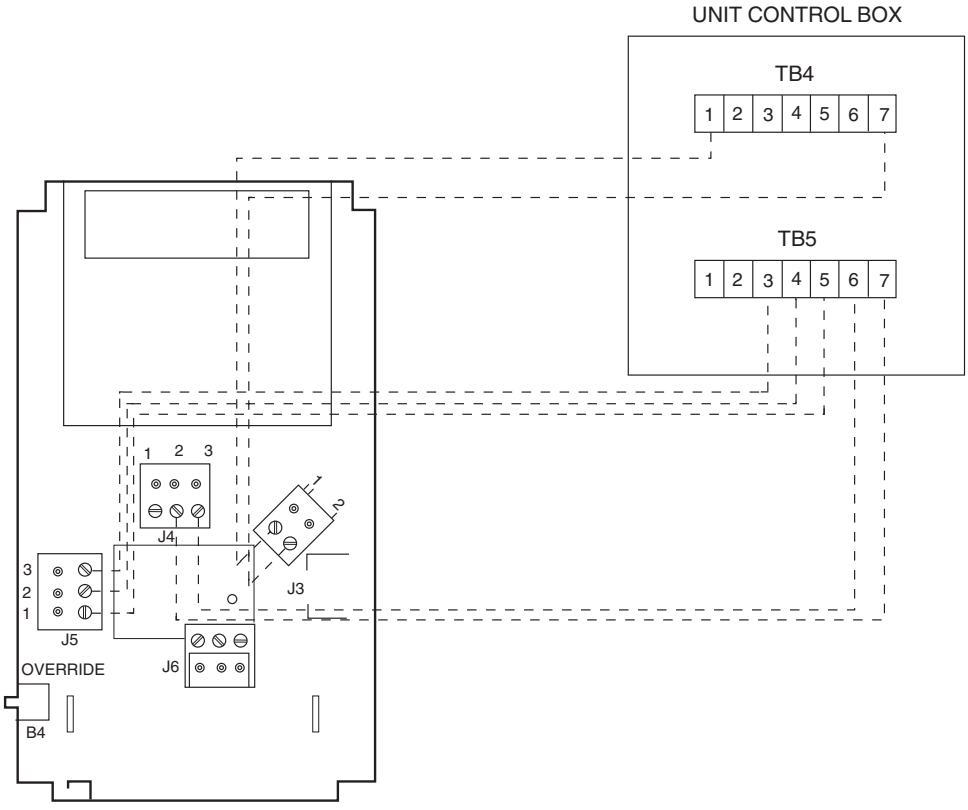


Fig. 18 — CO_2 and Space Temperature Sensor Wiring (33ZCT55CO2 and 33ZCT56CO2)

MOTORMASTER® V CONTROL — For operation below 32 F when an economizer is not used, the units can be equipped with an accessory Motormaster V control, which controls the speed of the stage 1 condenser fans. The Motormaster V control is a 3-phase inverter that controls the speed of the fans based on a pressure transducer connected to the liquid line. On 20 to 35 ton units, one fan will be controlled. On 40 to 60 ton units, two fans will be controlled. For units equipped with an economizer, there should not be a need for this control because the economizer can provide free cooling using outside air, which will be significantly lower in operating cost.

ACCESSORY NAVIGATOR — The accessory handheld Navigator display can be used with the 48/50A series units. See Fig. 19. The Navigator operates the same way as the Scrolling Marquee device. The ECB1 and ECB2 boards contain a second LEN port (J3 connection) than can be used with the handheld Navigator display.

CONTROL MODULE COMMUNICATIONS

Red LED — Proper operation of the control boards can be visually checked by looking at the red status LEDs as shown on Fig. 10-13. When operating correctly, the red status LEDs should blink in unison at a rate of once every 2 seconds. If the red LEDs are not blinking in unison, verify that correct power is being supplied to all modules. Also, be sure that the Main Base Board is supplied with the current software. If necessary, reload current software. If the problem still persists, replace the MBB. A board LED that is lit continuously or blinking at a rate of once per second or faster indicates that the board should be replaced.

Green LED — The boards also have a green LED, which is the indicator of the operation of the LEN communications, which is used for communications between the boards. On the MBB board the Local Equipment Network (LEN) LED should always be blinking whenever power is on. All other boards have a LEN LED that will blink whenever power is on and there is communication occurring. If LEN LED is not blinking, check LEN connections for potential communication errors (J3 and J4 connectors). A 3-wire sensor bus accomplishes communication between modules. These 3 wires run in parallel from module to module.

Yellow LED — The MBB has one yellow LED. The Carrier Comfort Network (CCN) LED will blink during times of network communication. The other boards do not have a CCN communications port.

CARRIER COMFORT NETWORK INTERFACE — The 48/50A series units can be connected to the CCN if desired. The communication bus wiring is a shielded, 3-conductor cable with drain wire and is field supplied and installed. See the Installation instructions for wiring information. The system elements are connected to the communication bus in a daisy chain arrangement. The positive pin of each system element communication connector must be wired to the positive pins of the system elements on either side of it. This is also required for the negative and signal ground pins of each system element. Wiring connections for CCN should be made at TB3. See Fig. 20. Consult the CCN Contractor's Manual for further information.

NOTE: Conductors and drain wire must be 20-AWG (American Wire Gage) minimum stranded, tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –20 C to 60 C is required.

It is important when connecting to a CCN communication bus that a color-coding scheme be used for the entire network to simplify the installation. It is recommended that red be used for the signal positive, black for the signal negative and white for the signal ground. Use a similar scheme for cables containing different colored wires.

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous shield must be connected to a ground at one point only. If the communication bus cable exits from one building and enters another, the shields must be connected to grounds at the lightning suppressor in each building where the cable enters or exits the building (one point per building only). To connect the unit to the network:

1. Turn off power to the control box.
2. Cut the CCN wire and strip the ends of the red (+), white (ground), and black (–) conductors. (Substitute appropriate colors for different colored cables.)
3. Connect the red wire to (+) terminal on TB3 of the plug, the white wire to COM terminal, and the black wire to the (–) terminal.
4. The RJ14 CCN connector on TB3 can also be used, but is only intended for temporary connection (for example, a laptop computer running Service Tool).
5. Restore power to unit.

IMPORTANT: A shorted CCN bus cable will prevent some routines from running and may prevent the unit from starting. If abnormal conditions occur, unplug the connector. If conditions return to normal, check the CCN connector and cable. Run new cable if necessary. A short in one section of the bus can cause problems with all system elements on the bus.

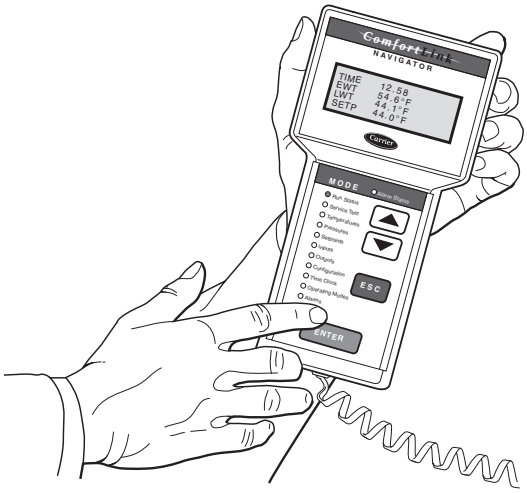
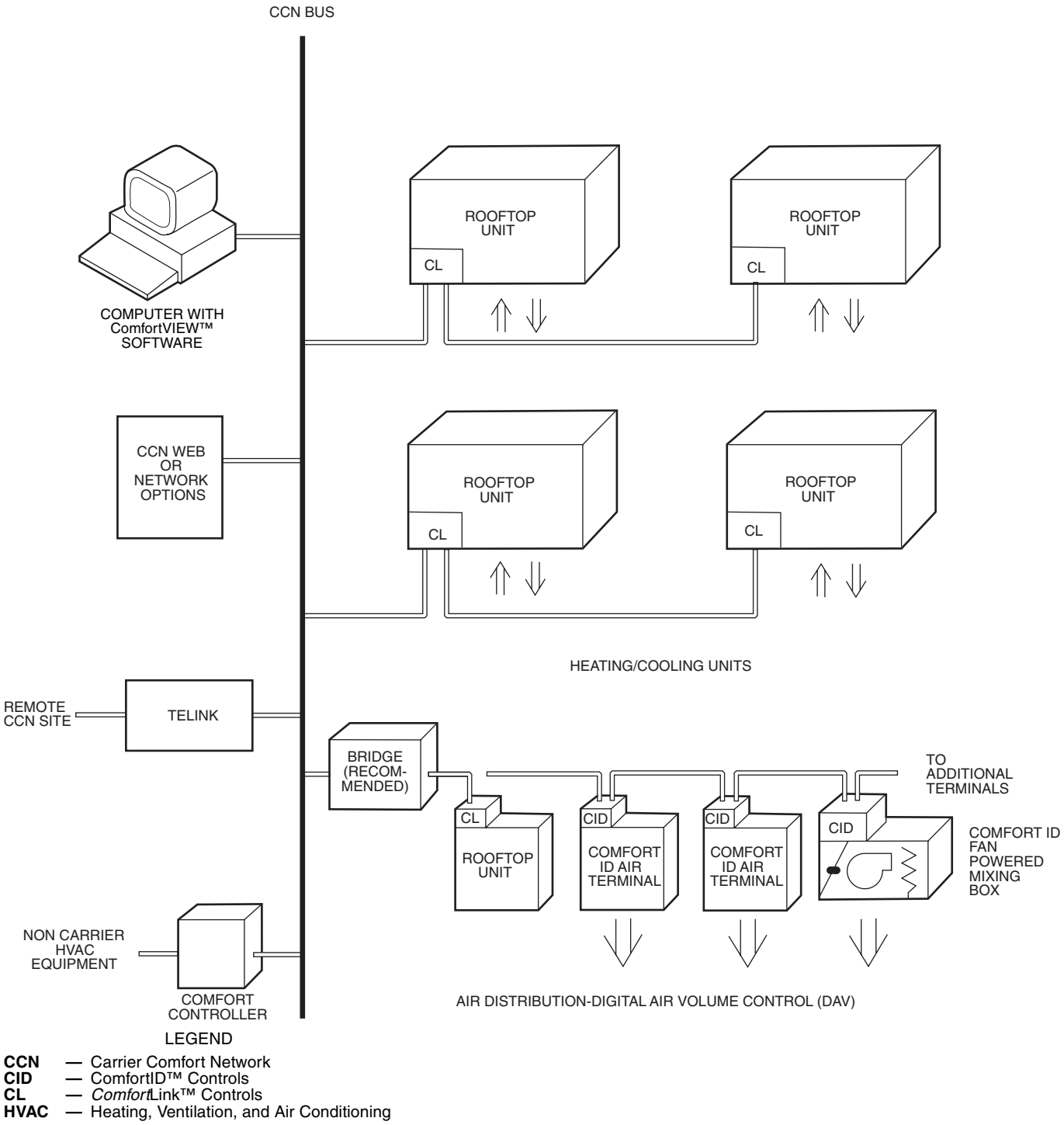


Fig. 19 — Accessory Navigator Display

Table 10 — Field Connection Terminal Strips

TERMINAL BOARD	TERMINAL NO.	DESCRIPTION	TYPE
TB-1 - POWER CONNECTION OR DISCONNECT (in Main Control Box)			
TB1	11	L1 power supply	208-230/460/575/380/-3-60, 400-3-50
	12	L2 power supply	208-230/460/575/380/-3-60, 400-3-50
	13	L3 power supply	208-230/460/575/380/-3-60, 400-3-50
TB-2 - GROUND (in Main Control Box)			
TB2	1	Neutral Power	
TB-3 - CCN COMMUNICATIONS (HY84HA096) (in Main Control Box)			
TB3	1	LEN +	5 VDC, logic
	2	LEN C	5 VDC, logic
	3	LEN –	5 VDC, logic
	4	24 VAC	24 VAC
	5	CCN +	5 VDC, logic
	6	CCN c	5 VDC, logic
	7	CCN –	5 VDC, logic
	8	Grd	ground
TB-4 - THEROMSTAT CONNECTIONS (HY84HA090) (in Main Control Box)			
TB4	1	Thermostat R	24VAC
	2	Thermostat Y1	24VAC
	3	Thermostat Y2	24VAC
	4	Thermostat W1	24VAC
	5	Thermostat W2	24VAC
	6	Thermostat G	24VAC
	7	Thermostat C	24VAC
	8	Thermostat X	24VAC
TB-5 - FIELD CONNECTIONS (HY84HA101) (in Main Control Box)			
TB5	1	VAV Heater Interlock Relay, Ground	external 24 VDC relay
	2	VAV Heater Interlock Relay, 24 VAC	external 24 VDC relay
	3	T56 Sensor	5VDC
	4	T56/T58 Ground	5VDC
	5	T58 Setpoint	5VDC
	6	Indoor Air IAQ Remote Sensor/Remote Pot/Remote 4-20 mA	4-20 mA, ext. powered w/res or 0-5 VDC
	7	Indoor Air IAQ Remote Sensor/Remote Pot/Remote 4-20 mA	4-20 mA, ext. powered w/res or 0-5 VDC
	8	Smoke Detector Remote Alarm	external contacts
	9	Smoke Detector Remote Alarm	external contacts
	10	Fire Shutdown	24 VAC external
	11	Fire Shutdown	external contact
	12	Fire Control Common	external contact
	13	Fire Pressurization	external contact
	14	Fire Evacuation	external contact
	15	Fire Smoke Purge	external contact
	16	Not Used	—
TB-6 - FIELD CONNECTIONS (HY84HA101) (in Main Control Box)			
TB6	1	Remote Occupied/Economizer Enable 24 VAC	external 24 VAC contact
	2	Remote Economizer Contact	external 24 VAC contact
	3	Remote Occupied Contact	external 24 VAC contact
	4	Demand Limit Contacts Common	external 24 VAC contact
	5	Demand Limit Redline	external 24 VAC contact
	6	Demand Limit Loadshed	external 24 VAC contact
	7	Demand Limit 4-20 mA	externally powered 4-20 mA
	8	Demand Limit 4-20 mA	externally powered 4-20 mA
	9	Remote Supply Air Setpoint 4-20 mA	externally powered 4-20 mA
	10	Remote Supply Air Setpoint 4-20 mA	externally powered 4-20 mA
	11	Outdoor Air IAQ 4-20 mA	externally powered 4-20 mA
	12	Outdoor Air IAQ 4-20 mA	externally powered 4-20 mA
	13	IAQ Remote Switch	external contact
	14	IAQ Remote Switch	external contact
	15	Not Used	—
	16	Not Used	—
TB-7 - ELECTRIC HEAT POWER BLOCK (in Electric Heat section)			
TB7	1	L1 Power Supply	208-230/460/575/380/-3-60, 400-3-50
	2	L2 Power Supply	208-230/460/575/380/-3-60, 400-3-50
	3	L3 Power Supply	208-230/460/575/380/-3-60, 400-3-50



LEGEND

CCN — Carrier Comfort Network
CID — ComfortID™ Controls
CL — *Comfort*Link™ Controls
HVAC — Heating, Ventilation, and Air Conditioning

Fig. 20 — CCN Network System Architecture

CONTROL FUNCTIONS

Overview — The *Comfort*Link™ controls and software have a large number of features that will meet the requirements of broad range of applications. The controls are pre-configured from the factory for the various factory-installed options, but there will be field configurations required to setup the unit for particular applications and field-installed accessories.

Common VAV and CV Standard Features:

- Cooling capacity control of up to four compressors and one minimum load valve (MLV), to maintain required space conditions during occupied and unoccupied periods.
- Automatic lead-lag of the compressors which changes at full and zero load.
- Minimum compressor on and off times for oil return and compressor reliability.
- Monitoring of suction pressure using pressure transducers for diagnostics and coil freeze protection.
- Control of two outdoor condenser fan contactors based on saturated condensing temperature and outdoor air temperature for head pressure control.
- Support of Motormaster® V control for low ambient head pressure control if needed (the most energy efficient unit will use an economizer and free cooling at low ambient conditions).
- Control of modulating economizer damper to provide free cooling when outdoor conditions are suitable, using Supply-Air Temperature as the basis of the control point A digitally controlled economizer is used which provides diagnostic feedback.
- Economizer changeover control by dry bulb, differential dry bulb, enthalpy, differential enthalpy or max dew point custom curve. Instead of the conventional enthalpy sensor or switch, this control uses a dry bulb sensor and a humidity sensor and then calculates the enthalpy. The standard A, B, C, and D enthalpy changeover curves are also stored in the software. Direct readout of the humidity is available as well as other features due to the use of the humidity sensor.
- Three-position economizer damper relay control for fixed ventilation applications. Unit also has a mechanical 2-position damper for applications that cannot use an economizer, but require ventilation air for IAQ control.
- Support of demand control ventilation through a reset of the economizer's minimum position. This reset based on differential CO_2 PPM (outdoor and indoor) can be chosen as linear or as fast or slow-acting exponential curves.
- Support of Remote Occupied/Unoccupied input to start/stop the unit.
- Control of the Economizer Damper and Indoor Fan to obtain Night Time Free Cooling.
- Pre-Occupancy IAQ Purge function.
- Building Pressure control via four or six Power-Exhaust Fan relay outputs. The building pressure sensor is read directly by the *Comfort*Link controls and can be configured through the unit display.
- Demand Limit function based on demand limit switches or demand limit 4 to 20 mA external signal or CCN Loadshed POC commands.
- Alarm monitoring of all key parameters.
- Communications support on the CCN and LEN network.
- Full electronic 365-day timeclock with backup capability. Timeclock supports hour, minute, day of week, month, date and year.
- Daylight Savings Time function.
- Occupancy control with 8 periods for unit operation.
- Holiday Table containing up to 30 holidays within the control.
- Ability to initiate timed override from T55, T56 and T58 devices.
- Ability to use multiple space temperature sensors (T55 only) to average Space Temperature external to the control.
- Ability to support the CCN communicating T58 sensor.
- Factory Test for end of production line tests.
- Temperature Compensated Start algorithm to calculate early start time before the occupancy period.
- Linkage function for interface with a ComfortID™ system.
- Support of Display, Maintenance, Configuration, Service, and Set Point data tables for interface with Building Supervisor, Service Tool, ComfortVIEW™, and Comfort-WORKS® software.
- Control of up to 6 relay outputs for gas or electric heat to maintain a heating set point. Note that when this is used on VAV systems the HIR (heat interlock relay) must be connected to the terminal controls to drive the dampers open.
- Control using conventional (Y1, Y2, W1, W2, G) thermostat inputs (TSTAT control) (CV only).
- Ability to have up to 6 stages of capacity with a conventional Y1, Y2, W1, W2 thermostat using a high and low cooling and heat logic (CV only).
- Support of a minimum load hot gas bypass valve for low load applications. Valve is controlled directly by the control and is an additional step of capacity as well as a low evaporator protection device.
- Adjustment of space set points (configurable amount ± 1 to 10° F) when using T-56 sensor (SPTO) (CV only).
- Control of an Indoor Fan/Supply Fan relay.
- Enable Heating or Cooling during Unoccupied periods as required to maintain Space Temperature within the unoccupied set points.
- Provide Discrete inputs for Fan Status, Filter Status, and Field Applied Status.
- Provide an output for the external Alarm Light Indicator.
- Integral return air smoke detector.
- Smoke Control modes including Evacuation, Smoke Purge, Pressurization, and Fire Shutdown (CEM required).
- Provide power exhaust outputs for direct control of modulated power exhaust stages during Fire/Smoke modes.
- Enable Heating or Cooling during Unoccupied periods as required by Nighttime thermostat inputs, or to maintain Space Temperature or Return-Air Temperature within the unoccupied set points.

VAV Only Standard Features:

- Supply Duct Static Pressure Control by means of a 4 to 20 mA controlled VFD.
- Support of external Supply Air Temperature Reset analog input to reset supply air set point upward (CEM required).
- Control of a heat-interlock relay, which must be used for ensuring that the terminals are providing the minimum CFM for heating.
- Space Temperature Reset algorithm to reset Supply Air set point upward when Space Temperature falls below its occupied cooling set point.
- Provide duct static pressure reset support for linkage with air terminals.

Scrolling Marquee Display Operation — The key to the setup, operation, and diagnostics for the 48/50A series *Comfort*Link™ Control System is the Scrolling Marquee display. All units are shipped from the factory with the Scrolling Marquee display, which is located in the main control box. See Fig. 14.

In addition, the *Comfort*Link control also supports the use of the hand held Navigator which can be plugged into the J11 jack in the main control box on TB3. The Navigator can also be plugged into the J11 jacks located on the ECB1 and ECB2 boards located in the auxiliary box behind the filter access door on the opposite end of the unit.

Both displays provide the user with an interface to the *Comfort*Link control system. The displays have UP and DOWN arrow keys, and an ESCAPE key and an ENTER key. These keys are used to navigate through the different levels of the display structure. The Navigator and the Scrolling Marquee operate in the same manner, except that the Navigator has multiple lines of display and the Scrolling Marquee has a single line. All further discussions and examples in this document will be based on the Scrolling Marquee display.

The 4 keys are used to navigate through the display structure, which is organized in a tiered mode structure as shown in Tables 11-22. If the buttons have not been used for a period the display will default to the AUTOVIEW display category as shown under the RUN STATUS category. To show the top-level display, press the ESCAPE key until a blank display is shown. Then use the UP and DOWN arrow keys to scroll through the top-level categories. These are listed at the top of Table 11 and will be indicated on the Scrolling Marquee by the LED next to each mode listed on the face of the display.

When a specific mode or sub-mode is located, push the ENTER key to enter the mode. Depending on the mode, there may be additional tiers of categories. Continue to use the UP and DOWN keys and the ENTER keys until the desired display item is found. At any time, the user can move back a mode level by pressing the ESCAPE key. Once an item has been selected the display will flash showing the item, followed by the item value and then followed by the item units (if any).

Items in the Configuration and Service Test modes are password protected. The display will flash PASS and WORD when required. Use the ENTER and arrow keys to enter the 4 digits of the password. The default password is 1111.

Pressing the ESCAPE and ENTER keys simultaneously will scroll a clear language text description across the display indicating the full meaning of each display acronym. Pressing the ESCAPE and ENTER keys when the display is blank (MODE LED level) will return the display to its default menu of rotating AUTO VIEW display items. In addition the password will be disabled requiring that it be entered again before changes can be made to password-protected items.

Changing item values or testing outputs is accomplished in the same manner. Locate and display the desired item. Press the ENTER key to stop the display at the item value. Press the ENTER key again so that the item value flashes. Use the arrow keys to change the value of state of an item and press the ENTER key to accept it. Press the ESCAPE key and the item, value or units display will resume. Repeat the process as required for other items. See Tables 11-22.

Depending on the unit Model, Factory-Installed Options and Field-Installed Accessories, some of the items in the various Mode categories may not apply.

CCN Tables and Display — In addition to the unit-mounted Scrolling Marquee display, the user can also access the same information through the CCN tables by using the Service tool or other CCN programs. Details on the CCN Service tool tables are summarized in Appendix A. The variable names used for the CCN tables and the Scrolling Marquee tables may be different and more items are displayed in the CCN tables. As a reference, the CCN variable names are included in the Scrolling Marquee tables and the Scrolling Marquee names are included in the CCN tables in Appendix A.

Table 11 — Scrolling Marquee Menu Display Structure

RUN STATUS	SERVICE TEST	TEMPERA-TURES	PRESSURES	SET POINTS	INPUTS	OUTPUTS	CONFIGURA-TION	TIME CLOCK	OPERATING MODES	ALARMS
Auto View of Run Status (VIEW)	Software Command Disable (STOP)	Unit Temperatures (UNIT)	Circuit Pressures (CIRC)	Cooling Setpoints (COOL)	Thermostat Inputs (STAT)	Fan Outputs (FANS)	Unit Configuration (UNIT)	Time (TIME)	Operating Modes (MODE)	Current Active Alarms (CURR)
Software Version Numbers (VERS)	Service Test Mode (TEST)	Circuit Temperatures (CIRC)	Air Pressure (AIR)	Heating Setpoints (HEAT)	Switch Inputs (SW.IN)	Compressor Outputs (CMPR)	Cooling Configuration (COOL)	Date (DATE)		Reset All Current Alarms (R.CURR)
Cir and Comp Run Hours (HRS)	Test Independent Outputs (INDP)	Calibrate Temperatures (CAL)	Calibrate Pressures (CAL)	Heat-Cool Setpoint Gap (GAP)	IAQ Input (AQ.IN)	Heat Outputs (HEAT)	Heating Configuration (HEAT)	Daylight Savings Config (DST)		Alarm History (HIST)
Compressor Starts (STRT)	Test Fans (FANS)			Static Pressure (SP.SP)	Compressor Current Sensor (CS.IN)	Economizer Outputs (ECON)	Tempering Configuration (TMPR)	Schedule Number (SCH.N)		Reset Alarm History (R.HIS)
TimeGuards (TMGD)	Test Cooling (COOL)			Building Pressure Setpoint (BP.SP)	Miscell-neous Inputs (MISC)		Economizer Configuration (ECON)	SPT Override Enabled (OVR.S)		
	Test Heating (HEAT)			Supply Air Setpoint (SA.SP)			SF VFD Parameters (SVFD)	T58 Override Enabled (OVR.T)		
				Heating Supply Air Setpt Heating (SA.SH)			Building Pressure Params (BP)	Global Schedule Override? (OVR.G)		
				Supply Air Setpoint Hi Cool (HI.SA)			IAQ Configuration (IAQ)	Override Time Limit (OTL)		
				Supply Air Setpoint Lo Cool (LO.SA)			Optional Sensor Configuration (OPTS)	Local Occupancy Schedule (SCH.L)		
							Comfort Demand Config. (CMF.D)	Accept Global Holidays? (HOL.G)		
							Supply Air Reset Config. (RST)	Local Holiday Schedule (HOL.L)		
							Demand Limit Config. (DMD.L)			
							CCN Configuration (CCN)			
							Display Configuration (DISP)			
							Switch Logic: NO / NC (SW.LG)			
							Alert Limit Config. (ALLM)			

Table 12 — Run Status Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric					
VIEW	ENTER	VIEW					Auto View of Run Status	Scrolls automatically through the Displays		
	▼	HVC.M	TEXT	—	—	see list	Current HVAC Mode	See mode list table	MODES	HVACMODE
	▼	EDT	XXX.X	F	C	–40 to 240	Evaporator Discharge Tmp	See Note	CAPACITY, ECONWORK, STATUS1 EDT_WORK	EDT
	▼	LAT	XXX.X	F	C	–40 to 240	Leaving Air Temperature	See Note	STATUS1, ECONDIAG, EDT_WORK	LAT
	▼	E.CPT	XXX.X	F	C	calculated	Economizer Control Point	supply air setpoint plus reset	ECONOWORK, ECONDIAG	ECONCPNT
	▼	C.CPT	XXX.X	F	C	calculated	Cooling Control Point	Control point for the leaving air temperature when mechanical cooling is being used	CAPACITY	C.CPT
	▼	H.CPT	XXX.X	F	C	calculated	Heating Control Point	Control point for the leaving air temperature in heating mode	—	—
	▼	SA.RS	XXX.X	F	C	calculated	Supply Air Reset Amount	Amount of temperature reset being used for supply air temperature	STATUS2	SASPRSET
	▼	LOD.F	XXX	%	%'	–100 to 100	Capacity Load Factor	+100% = Add a stage; –100%= remove a stage	CAPACITY	SMZ
	▼	C.CAP	XXX	%	%'	0 to 100%	Cooling % Total Capacity	% of Maximum unit nominal cooling capacity	STATUS1	CCAP
	▼	H.CAP	XXX	%	%'		Heating % Total Capacity	% of Maximum unit nominal heating capacity	STATUS1	HCAP
	▼	OCC	TEXT	—	—	YES/NO	Occupied	Actual Operation will depend on Unoccupied configuration	CONTROLLER-TIME	OCC
	▼	TIME	XX.XX	HR:MIN	HR:MIN	00.00-23.59	Time of Day	Time of day in hr:minutes	CONTROLLER-TIME	TIMECOPY
	▼	ALRM	XXXX	—	—	see alarm table	Current Alarms & Alerts	Number of Alarms	CONTROLLER-TIME	ALRMALRT
VERS	ENTER	VERS				1-??	Software Version Number			
	▼	MBB	TEXT	—	—	MBB	CESR131343-XX-XX	XX-XX is software version number (ie 01-03)	VERSIONS	MBB_SW
	▼	ECB1	TEXT	—	—	ECB1	CESR131249-XX-XX	Indicates the software that has been loaded. (Only boards that are connected will be displayed)	VERSIONS	ECB1_SW
	▼	ECB2	TEXT	—	—	ECB2	CESR131249-XX-XX		VERSIONS	ECB2_SW
	▼	NAVI	TEXT	—	—	NAVI	CESR131227-XX-XX		VERSIONS	NAVI_SW
	▼	SCB	TEXT	—	—	SCB	CESR131226-XX-XX		VERSIONS	SCB
	▼	CEM	TEXT	—	—	CEM	CESR13174-XX-XX		VERSIONS	EMM_SW
	▼	MARQ	TEXT	—	—	MARQ	CESR131171-XX-XX		VERSIONS	MARQ_SW

NOTE:
LAT = EDT for units operating in cool and heat has been off for several minutes.
LAT = Average of LAT.1, LAT.2, and LAT.3 for units with staged gas heat (LAT.1, LAT.2, and LAT.3 found in Temperatures, Unit Submode).
If EDT is in factory-installed position on fan then in heat LAT will not be available.
If EDT has been relocated to after heaters and unit is in heat then EDT will not be available.

Table 12 — Run Status Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric					
HRS	ENTER	HRS					Circ and Comp Run Hours	Displays information on Hours of operation		
	▼	HRS.U	XXXX	hrs	hrs	0-999999	Machine Operating Hours	hrs of operation for the overall machine with compression on	STRTHOUR	HR_MACH
	▼	HRS.A	XXXX	hrs	hrs	0-999999	Circuit A Run Hours	hrs of operation for circuit A compression	STRTHOUR	HR_CIRA
	▼	HRS.B	XXXX	hrs	hrs	0-999999	Circuit B Run Hours	hrs of operation for Circuit B compression	STRTHOUR	HR_CIRB
	▼	HR.A1	XXXX	hrs	hrs	0-999999	Compressor A1 Run Hours	hrs of operation for Compressor A1	STRTHOUR	HOURS_A1
	▼	HR.A2	XXXX	hrs	hrs	0-999999	Compressor A2 Run Hours	hrs of operation for Compressor A2	STRTHOUR	HOURS_A2
	▼	HR.B1	XXXX	hrs	hrs	0-999999	Compressor B1 Run Hours	hrs of operation for Compressor B1	STRTHOUR	HOURS_B1
	▼	HR.B2	XXXX	hrs	hrs	0-999999	Compressor B2 Run Hours	hrs of operation for Compressor B2	STRTHOUR	HOURS_B2
STRT	ENTER	STRT					Compressor Starts	Displays information on compressor starts		
	▼	STR.U	XXXX	—	—	0-999999	Machine Starts	Number of starts for the machine (compressors)	STRTHOUR	CY_MACH
	▼	STR.A	XXXX	—	—	0-999999	Circuit A Starts	Number of starts for circuit A (compressors)	STRTHOUR	CY_CIRA
	▼	STR.B	XXXX	—	—	0-999999	Circuit B Starts	Number of starts for circuit B (compressors)	STRTHOUR	CY_CIRB
	▼	ST.A1	XXXX	—	—	0-999999	Compressor A1 Starts	Number of starts for Compressor A1	STRTHOUR	CY_A1
	▼	ST.A2	XXXX	—	—	0-999999	Compressor A2 Starts	Number of starts for Compressor A1	STRTHOUR	CY_A2
	▼	ST.B1	XXXX	—	—	0-999999	Compressor B1 Starts	Number of starts for Compressor B1	STRTHOUR	CY_B1
	▼	ST.B2	XXXX	—	—	0-999999	Compressor B2 Starts	Number of starts for Compressor B2	STRTHOUR	CY_B2
TMGD	ENTER						Timeguards	Displays information on timeguard timers		
	▼	TG.A1	XXXX	sec	sec	0-180	A1 Timeguard	This is the time remaining on a timeguard. If off it is the time to when it can restart. If On it is the time to when it could turn off	CIRCUITA	CMPA1_TG
	▼	TG.A2	XXXX	sec	sec	0-180	A2 Timeguard		CIRCUITA	CMPA2_TG
	▼	TG.B1	XXXX	sec	sec	0-180	B1 Timeguard		CIRCUITB	CMPB1_TG
	▼	TG.B2	XXXX	sec	sec	0-180	B2 Timeguard		CIRCUITB	CMPB2_TG
	▼	TG.H1	XXXX	sec	sec	0-180	Heat Stage 1 Timeguard		HEATSTAT	HS1_TG
	▼	YG.H2	XXXX	sec	sec	0-180	Heat Stage 2 Timeguard		HEATSTAT	HS2_TG
	▼	YG.H3	XXXX	sec	sec	0-180	Heat Stage 3 Timeguard		HEATSTAT	HS3_TG
	▼	TG.H4	XXXX	sec	sec	0-180	Heat Stage 4 Timeguard		HEATSTAT	HS4_TG
	▼	TG.H5	XXXX	sec	sec	0-180	Heat Stage 5 Timeguard		HEATSTAT	HS5_TG
	▼	TG.H6	XXXX	sec	sec	0-180	Heat Stage 6 Timeguard		HEATSTAT	HS6_TG

Table 13 — Service Test Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric					
STOP	ENTER	STOP	TEXT	—	—	NO/YES	Software Command Disable	Use to stop machine from running (equivalent of an on-off switch)	TESTOUTS	UNITSTOP
TEST	ENTER	TEST	TEXT	—	—	OFF/ON	Service Test Mode	Will allow you to enter the test mode	TESTOUTS	MAN_CTRL
INDP	ENTER	INDP					Test Independent Outputs	Allows testing of independent outputs		
	▼	ECON	XXX	%	%	0-100	Economizer Position Test	will move economizer to % open, see Note	TESTOUTS	ECONCTST
	▼	E.PWR	TEXT	—	—	OFF/ON	Economizer Power Test	controls economizer power relay	TESTOUTS	ECONPTST
	▼	E.CAL	TEXT	—	—	NO/YES	Calibrate Economizer?	economizer will self calibrate	TESTOUTS	ECON_CAL
	▼	PE.A	TEXT	—	—	OFF/ON	Power Exhaust Stage A	Turn on Exhaust stage A	TESTOUTS	PE_A_TST
	▼	PE.B	TEXT	—	—	OFF/ON	Power Exhaust Stage B	Turn on Exhaust stage B	TESTOUTS	PE_B_TST
	▼	PE.C	TEXT	—	—	OFF/ON	Power Exhaust Stage C	Turn on Exhaust stage C	TESTOUTS	PE_C_TST
	▼	H.I.R.	TEXT	—	—	OFF/ON	Heat Interlock Relay Test	Turn on Heat Interlock Relay*	TESTOUTS	HIR_TST
	▼	ALR	TEXT	—	—	OFF/ON	Remote Alarm Relay	turn on alarm relay	TESTOUTS	ALRM_TST
FANS	ENTER	FANS					Test Fans	Allows for test of fans and inverters		
	▼	S.FAN	TEXT	—	—	OFF/ON	Supply Fan Relay	Turn on supply fan	TESTOUTS	SFAN_TST
	▼	S.VFD	XXX	%	%	0-100	Supply Fan VFD Speed	will drive inverter to % speed	TESTOUTS	SFVFDTST
	▼	OFC.A	TEXT	—	—	OFF/ON	Condenser Fan A	Turn on condenser fan stage A	TESTOUTS	CNDA_TST
	▼	OFC.B	TEXT	—	—	OFF/ON	Condenser Fan B	Turn on condenser fan stage B	TESTOUTS	CNDB_TST
COOL	ENTER	COOL					Test Cooling	Allows for testing of compressor outputs		
	▼	A1	TEXT	—	—	OFF/ON	Compressor A1 Relay	Turn on compressor A1 and fans	TESTOUTS	CMPA1TST
	▼	A2	TEXT	—	—	OFF/ON	Compressor A2 Relay	Turn on compressor A2 and fans	TESTOUTS	CMPA2TST
	▼	MLV	TEXT	—	—	OPN/CLS	Minimum Load Valve	Turn on Min load valve (valve open)	TESTOUTS	MLV_TST
	▼	B1	TEXT	—	—	OFF/ON	Compressor B1 Relay	Turn on compressor B1 and fans	TESTOUTS	CMPB1TST
	▼	B2	TEXT	—	—	OFF/ON	Compressor B2 Relay	Turn on compressor B2 and fans	TESTOUTS	CMPB2TST
HEAT	ENTER	HEAT					Heat Test	Allows for test of heat stages		
	▼	HS.1	TEXT	—	—	OFF/ON	Heat Stage 1	Turn on heat stage 1	TESTOUTS	HS1_TST
	▼	HS.2	TEXT	—	—	OFF/ON	Heat Stage 2	Turn on heat stage 2	TESTOUTS	HS2_TST
	▼	HS.3	TEXT	—	—	OFF/ON	Heat Stage 3	Turn on heat stage 3 (only staged gas)	TESTOUTS	HS3_TST
	▼	HS.4	TEXT	—	—	OFF/ON	Heat Stage 4	Turn on heat stage 4 (only staged gas)	TESTOUTS	HS4_TST
	▼	HS.5	TEXT	—	—	OFF/ON	Heat Stage 5	Turn on heat stage 5 (only staged gas)	TESTOUTS	HS5_TST
	▼	HS.6	TEXT	—	—	OFF/ON	Heat Stage 6	Turn on heat stage 6 (only staged gas)	TESTOUTS	HS6_TST

*Must be used on VAV units with electric or gas heat.

Table 14 — Temperature Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
UNIT	ENTER								Unit Temperatures	Allows for reading of temperatures		
	▼	OAT	XXX.X	F	C	NA	NA	–40 to 240	Outside Air Temperature	OAT Entering outdoor air hood	CAPACITY, ECONWORK, ENTHALPY, STATUS1, ANALOGIN, EDT_WORK	OAT
	▼	RAT	XXX.X	F	C	NA	NA	–40 to 240	Return Air Temperature	Return temperature inside unit, located before return damper	ENTHALPY, STATUS1, ANALOGIN, ECONDIAG	RAT
	▼	MAT	XXX.X	F	C	NA	NA	–40 to 240	Mixed Air Temperature	calculated value	CAPACITY, STATUS1, ECONDIAG, EDT_WORK	MAT
	▼	EDT	XXX.X	F	C	NA	NA	–40 to 240	Evaporator Discharge Tmp	See Note	CAPACITY, ECONWORK, STATUS1, EDT_WORK	EDT
	▼	LAT	XXX.X	F	C	NA	NA	–40 to 240	Leaving Air Temperature	See Note	STATUS1, ECONDIAG, EDT_WORK	LAT
	▼	SPT	XXX.X	F	C	NA	NA	–40 to 240	Space Temperature	only on units with T55/T56 Space Sensor	STATUS1 ANALOGIN	SPT
	▼	SPTO	XXX.X	F	C	NA	NA	–40 to 240	Space Temperature Offset	only with T56 thermostats	STATUS2	SPTO
	▼	LAT.1	XXX.X	F	C	NA	NA	–40 to 240	Staged Gas LAT 1	Leaving air (Staged gas heat only)	ANALOGIN, EDT_WORK	LAT1SGAS
	▼	LAT.2	XXX.X	F	C	NA	NA	–40 to 240	Staged Gas LAT 2	Leaving air (Staged gas heat only)	ANALOGIN, EDT_WORK	LAT2SGAS
	▼	LAT.3	XXX.X	F	C	NA	NA	–40 to 240	Staged Gas LAT 3	Leaving air (Staged gas heat only)	ANALOGIN, EDT_WORK	LAT3SGAS
CIRC	ENTER	CIRC							Circuit Temperatures	Displays circuit refrigerant temperatures		
	▼	SST.A	XXX.X	F	C	NA	NA	calculated	Cir A Sat Suction Temp	calculated from suction pressure	CIRCUITA ANALOGIN	SSTA
	▼	SCT.A	XXX.X	F	C	NA	NA	calculated	Cir A Sat Condensing Tmp	measured value (sensor on coil)	CIRCUITA ANALOGIN	SCTA
	▼	SST.B	XXX.X	F	C	NA	NA	calculated	Cir B Sat Suction Temp	calculated from suction pressure	CIRCUITB ANALOGIN	SSTB
	▼	SCT.B	XXX.X	F	C	NA	NA	calculated	Cir B Sat Condensing Tmp	measured value (sensor on coil)	CIRCUITB ANALOGIN	SCTB
CAL	ENTER	CAL							Calibrate Temperatures	Allows for calibration of temperatures sensors		
	▼	OAT.T	XXX.X	F	C	0	0	–10 to 10	OAT Trim	used for calibration of OAT sensor	SENSCNFG	OAT_TRIM
	▼	RAT.T	XXX.X	F	C	0	0	–10 to 10	RAT Trim	Used for calibration of RAT sensor	SENSCNFG	RAT_TRIM
	▼	SAT.T	XXX.X	F	C	0	0	–10 to 10	SAT Trim	Used for calibration of EDT sensor	SENSCNFG	SA_TRIM
	▼	SPT.T	XXX.X	F	C	0	0	–10 to 10	Space Temp Trim	used for calibration of SPT sensor	SENSCNFG	SPT_TRIM
	▼	SGT.T	XXX.X	F	C	0	0	–30 to 30	Staged Gas LAT Avg Trim	Used for calibration of average SGT.T sensors (LAT1, LAT2, LAT3)	SENSCNFG	SGT_TRIM
	▼	CTA.T	XXX.X	F	C	0	0	–30 to 30	Condensing Temp A Trim	Used for calibration of condensing temperature sensor in cir A	SENSCNFG	CTA_TRIM
	▼	CTB.T	XXX.X	F	C	0	0	–30 to 30	Condensing Temp B Trim	Used for calibration of condensing temperature sensor in cir B	SENSCNFG	CTB_TRIM

NOTE:
LAT = EDT for units operating in cool and heat has been off for several minutes.
LAT = Average of LAT.1, LAT.2, and LAT.3 for units with staged gas heat (LAT.1, LAT.2, and LAT.3 found in Temperatures, Unit Submode).
If EDT is in factory-installed position on fan then in heat LAT will not be available.
If EDT has been relocated to after heaters and unit is in heat then EDT will not be available.

Table 15 — Pressure Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
CIRC	ENTER	CIRC							Circuit Pressures	Used to read circuit refrigerant pressures		
	▼	SSP.A	XXX.X	psi	kpa	NA	NA	0-500	Cir A suction Pressure	circuit A suction pressure	CIRCUITA ANALOGIN	SP_A
	▼	SCP.A	XXX.X	XXXX	XXXX	NA	NA	0-500	Cir A Discharge Pressure	Pressure is calculated from SCTA	CIRCUITA ANALOGIN	DP_A
	▼	SSP.B	XXX.X	psi	kpa	NA	NA	0-500	Cir B Suction Pressure	circuit B suction pressure	CIRCUITB ANALOGIN	SP_B
	▼	SCP.B	XXX.X	psi	kpa	NA	NA	0-500	Cir B Discharge Pressure	Pressure is calculated from SCTB	CIRCUITB ANALOGIN	DP_B
AIR	ENTER	AIR							Air Pressures	Used to read airside pressures		
	▼	DUCT	X.XX	in-H_2O	pa	NA	NA	0-5	Duct Static Pressure	supply air duct pressure	SENSWORK SFS_WORK STATUS1 ANALOGIN	SP
	▼	BLDG	X.XXX	in-H_2O	pa	NA	NA	–2 to 2	Building Pressure	building pressure	BLDGPRES SENSWORK STATUS1 ANALOGIN	BP
	▼	BPSZ	X.XX	—	—	NA	NA	NA	BP Load Factor	Currently not used	BLDGPRES	BPSMZ
	▼	BP.IT	X.XXX	—	—	NA	NA	NA	BP PID/Integral Term	Currently not used	BLDGPRES	BPINT
CAL	ENTER	CAL							Calibrate Pressures			
	▼	DSP.T	X.XX	in-H_2O	pa	0	0	–10 to 10	Static Pressure Trim	Used to calibrated supply duct pressure (DUCT)	SENSCNFG	SP_TRIM
	▼	BP.T	X.XX	in-H_2O	pa	0	0	–10 to 10	Building Pressure Trim	Used to calibrate building pressure (BLDG)	BP_TRIM	BP_TRIM
	▼	SPAT	X.X	in-H_2O	pa	0	0	–50 to 50	Suction Pressure A Trim	Used to calibrate suction pressure sensor (SSP.A)	SENSCNFG	SPA_TRIM
	▼	SPBT	X.X	in-H_2O	pa	0	0	–50 to 50	Suction Pressure B Trim	Used to calibrate suction pressure sensor (SSP.B)	SENSCNFG	SPB_TRIM

Table 16 — Setpoint Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
COOL	ENTER								Cooling Setpoints	Used to adjust cooling setpoint		
	▼	OCSP	XX.X	F	C	78.0	78.0	55 to 80	Occupied Cooling Setpoint	Space or return air cooling occupied setpoint	SET_PNT	OHSP
	▼	UCSP	XX.X	F	C	90.0	90.0	75 to 95	Unoccupied Cooling Setpoint	Space or return air unoccupied setpoint	SET_PNT	UCSP
	▼	NT.LO	XX.X	F	C	50.0	50.0	40 to 70	Night Time Lockout Temp	Low Temperature protection setpoint during purge	SET_PNT	NTLO
	▼	V.C.ON	XX.X	F	C	72.0	NA	55 to 85	VAV Occ. Cool On Setpnt	Return air temperature above which cooling will start in reset mode	SET_PNT	VAVOCON
	▼	V.C.OF	XX.X	F	C	2.0	NA	1 to 25	VAV Occ. Cool Off Delta	Return air temperature delta below the V.C.ON which will turn off cooling and go into vent mode	SET_PNT	VAVOCOFF
HEAT	ENTER								Heating Setpoints	Used to adjust heating setpoint		
	▼	OHSP	XX.X	F	C	68.0	68.0	55 to 80	Occupied Heating Setpoint	Space or return air occupied setpoint used for heating control	SET_PNT	OHSP
	▼	UHSP	XX.X	F	C	55.0	55.0	40 to 80	Unoccupied Heating Setpoint	Space or return air setpoint unoccupied setpoint used for heating control	SET_PNT	UHSP
GAP	ENTER	GAP	X.X	F	C	5.0	5.0	2.0 to 10.0	Heat-Cool Set Point Gap	Only applies to space temp sensors	SET_PNT	HCSP_GAP
SP.SP	ENTER	SP.SP	X.X	H2O	Pa	1.5	NA	0.0 to 5.0	Static Pressure Setpoint	Supply air static pressure setpoint used for VAV fan speed control	SET_PNT	SPSP
BP.SP	ENTER	BP.SP	X.XX	H2O	Pa	0.05	0.05	-0.25 to 0.25	Building Pressure Setpoint	Building pressure static setpoint used for control of exhaust fans	SET_PNT	BPSP
SA.SP	ENTER	SA.SP	XX.X	F	C	55.0	55.0	45.0 to 75.0	Supply Air Setpoint	Unit supply air Temperature Air Setpoint for VAV cooling and economizer control	SET_PNT	SASP
SA.SH	ENTER	SA.SH	XXX	F	C	125.0	125.0	90.0 to 145	Heating Supply Air Setpt	Supply air temperature setpoint for Staged Gas Heating	SET_PNT	SASPHEAT
HI.SA	ENTER	HI.SA	XX	F	C	55.0	55.0	45.0 to 75.0	Supply Air Setpoint HI	High Cool Setpoint for demand cooling control	SET_PNT	SASP_HI
LO.SA	ENTER	LO.SA	XX	F	C	65.0	65.0	45.0 to 75.0	Supply Air Setpoint LO	Low Cool Setpoint for demand cooling control	SET_PNT	SASP_LO

Table 17 — Input Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric					
STAT	ENTER	STATS					Thermostat Inputs	Conventional thermostat inputs	TSTAT INPUTS	
	▼	Y1	TEXT	—	—	ON/OFF	Thermostat Y1 Input	Thermostat cool stage 1	TSTAT INPUTS	Y1
	▼	Y2	TEXT	—	—	ON/OFF	Thermostat Y2 Input	Thermostat cool stage 2	TSTAT INPUTS	Y2
	▼	W1	TEXT	—	—	ON/OFF	Thermostat W1 Input	Thermostat heat stage 1	TSTAT INPUTS	W1
	▼	W2	TEXT	—	—	ON/OFF	Thermostat W2 Input	Thermostat heat stage 2	TSTAT INPUTS	W2
	▼	G	TEXT	—	—	ON/OFF	Thermostat G Input	Thermostat fan on command	TSTAT INPUTS	G
SW.IN	ENTER	SW.IN		—	—		Switch Inputs	Allows for reading of switch inputs		
	▼	FIL.S	TEXT	—	—	DRT/CLN	Filter Status Input	Filter pressure drop switch	FLTSWORK STATUS1 INPUTS	FLTS
	▼	FAN.S	TEXT	—	—	ON/OFF	Supply Fan Status Input	Fan differential pressure switch input	BLDGPRES SFS_WORK STATUS1 INPUTS	SFS
	▼	GAS.F	TEXT	—	—	ON/OFF	Fan Request From IGC	only used on 48 Series units and is the command for fan operation from gas boards	INPUTS	GASFAN
	▼	FDWN	TEXT	—	—	ON/OFF	Fire Shutdown Input	Smoke detector or field fire switch input	STATUS2 INPUTS	FSD
	▼	F.PRS	TEXT	—	—	ON/OFF	Pressurization Input	External command for pressurization	STATUS2 INPUTS	PRES
	▼	F.EVC	TEXT	—	—	ON/OFF	Evacuation Input	External command for evacuation	STATUS2 INPUTS	EVAC
	▼	F.PRG	TEXT	—	—	ON/OFF	Fire Smoke Purge	External command for Smoke Purge	STATUS2 INPUTS	PURG
	▼	E.ENA	TEXT	—	—	ON/OFF	Remote Economizer Enable	External command to enable economizer	ECONWORK STATUS2 INPUTS	ECONENBL
	▼	E.OVR	TEXT			ON/OFF	Econo Position Override	External Command to open economizer	ECONWORK STATUS2 ECONDIAG ECONMIN INPUTS	ECOORIDE
	▼	RE.MT	TEXT	—	—	ON/OFF	Remote Input	used for remote occupancy switch	STATUS2 INPUTS	RMTIN
	▼	DLM.1	TEXT	—	—	ON/OFF	Demand Limit Switch 1	External demand limit switch 1	STATUS2 DMDLIMIT INPUTS	DMD_SW1
	▼	DLM.2	TEXT	—	—	ON/OFF	Demand Limit Switch 2	External demand limit switch 2	STATUS2 DMDLIMIT INPUTS	DMD_SW2

Table 17 — Input Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CNN POINT NAME
				English	SI					
AQ.IN	ENTER	AQ.IN					IAQ Inputs	IAQ and Demand Ventilation Inputs		
	▼	IAQ	XXXX	ppm	ppm	0-2000	IAQ — PPM Indoor CO2	IAQ sensor input	SENSWORK STATUS2 AIRQUALT ANALOGIN ECONMIN	IAQ
	▼	I.AQS	TEXT	—	—	LOW/HIGH	IAQ — Discrete Input	External command to increase outside air	STATUS2 AIRQUALT ECONMIN	IAQIN
	▼	OAQ	XXXX	ppm	ppm	0-2000	OAQ — PPM Outdoor CO2	Outdoor sensor input	AIRQUALT ANALOGIN ECONMIN	OAQ
	▼	DAQ	XXXX	ppm	ppm	0-2000	Diff. Air Quality in PPM	Differential air quality input	AIRQUALT ECONMIN	DAQ
	▼	OA.RH	XXX.X	%	%	0-100	Outside Air Rel. Humidity	Outdoor air relative humidity sensor	ENTHALPY STATUS2 ANALOGIN ECONDIAG	OARH
	▼	OA.EN	XXX.X	—	—	calculated	Outside Air Enthalpy	Calculated from OAT and OA.RH (BTU/LB)	ECONWORK ENTHALPY ECONDIAG	OAE
	▼	OA.DP	XXX.X	F	F	calculated	Outside Air Dewpoint	Outside air dewpoint temperature, calculated from OA.RH and OAT	ENTHALPY ECONDIAG	OADEWTMP
	▼	RA.RH	XXX.X	%	%	0-100	Return Air Rel. Humidity	Return air relative humidity sensor	ENTHALPY STATUS2 ANALOGIN ECONDIAG	RARH
	▼	RA.EN	XXX.X	—	—	calculated	Return Air Enthalpy	Calculated from RAT and RA.RH (BTU/LB)	ECONWORK ENTHALPY ECONDIAG	RAE
CS.IN	ENTER	CS.IN					Current Sensor Inputs	Compressor feedback digital inputs		
	▼	CS.A1	TEXT	—	—	ON/OFF	Compressor A1 feedback	Status of compressor A1 feedback signal	CIRCUIT A COMPRWORK	CSB_A1
	▼	CS.A2	TEXT	—	—	ON/OFF	Compressor A2 feedback	Status of compressor A1 feedback signal	CIRCUIT A COMPWORK	CSB_A2
	▼	CS.B1	TEXT	—	—	ON/OFF	Compressor B1 feedback	Status of compressor A1 feedback signal	CIRCUITB COMPWORK	CSB_B1
	▼	CS.B2	TEXT	—	—	ON/OFF	Compressor B2 feedback	Status of compressor A1 feedback signal	CIRCUITB COMPWORK	CSB_B2
MISC	ENTER	MISC					Miscellaneous Inputs	Miscellaneous inputs		
	▼	E.MPO	XXX	%	%	0-100	Econo Min. Pos. Override	Used for remote min position and remote economizer position control	SENSWORK AIRQUALT ECONMIN	IAQMINOV
	▼	DM.AI	XXX	%	%	0-100	Remote Demand Limit	4-20 mA remote input	ANALOGIN DMDLIMIT	DMDLMTMA
	▼	RM.SP	XXX	%	%	0-20	EDT Setpoint or Setpoint ma	Used for remote EDT setpoint control	ANALOGIN DMDLIMIT	EDTRESMA

Table 18 — Output Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CNN POINT NAME
				English	Metric					
FANS	ENTER						Fan Outputs	Indoor and Outdoor fan outputs		
	▼	S.FAN	TEXT	—	—	OFF/ON	Supply Fan State	Supply fan relay status	BLDGPRES ECONWORK FLTSWORK SFS_WORK STATUS1 ECONDIAG OUTPUTS	SFAN
	▼	S.VFD	XXX	%	%	0-100	Supply Fan Percent	inverter % full speed	OUTPUTS	SFAN_VFD
	▼	OFC.A	TEXT	—	—	OFF/ON	Condenser Fan A	Condenser Fan A relay	OUTPUTS	CONDFANA
	▼	OFC.B	TEXT	—	—	OFF/ON	Condenser Fan B	Condenser Fan B relay	OUTPUTS	CONDFANB
CMPR	ENTER						Compressor Outputs	Compressor outputs		
	▼	A1	TEXT	—	—	OFF/ON	Compressor A1	Compressor A1 relay status	CIRCUIT A COMPWORK OUTPUTS	CMPA1
	▼	A2	TEXT	—	—	OFF/ON	Compressor A2	Compressor A2 relay status	CIRCUIT A COMPWORK OUTPUTS	CMPA2
	▼	MLV	TEXT	—	—	OFF/ON	Minimum Load Valve	Minimum load valve relay status	CIRCUITA OUTPUTS	MLV
	▼	B1	TEXT	—	—	OFF/ON	Compressor B1	Compressor B1 relay status	CIRCUITB COMPWORK OUTPUTS	CMPB1
	▼	B2	TEXT	—	—	OFF/ON	Compressor B2	Compressor B2 relay status	CIRCUITB COMPWORK OUTPUTS	CMPB2

Table 18 — Output Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CNN POINT NAME
				English	Metric					
HEAT	ENTER						Heat Outputs	Gas & Electric Heat Outputs		
	▼	HS.1	TEXT	—	—	OFF/ON	Heat Stage 1	Heating stage 1 relay status	HEATSTAT OUTPUTS	HS1
	▼	HS.2	TEXT	—	—	OFF/ON	Heat Stage 2	Heating stage 2 relay status	HEATSTAT OUTPUTS	HS2
	▼	HS.3	TEXT	—	—	OFF/ON	Heat Stage 3	Heating stage 3 relay status	HEATSTAT OUTPUTS	HS3
	▼	HS.4	TEXT	—	—	OFF/ON	Heat Stage 4	Heating stage 4 relay status	HEATSTAT OUTPUTS	HS4
	▼	HS.5	TEXT	—	—	OFF/ON	Heat Stage 5	Heating stage 5 relay status	HEATSTAT OUTPUTS	HS5
	▼	HS.6	TEXT	—	—	OFF/ON	Heat Stage 6	Heating stage 6 relay status	HEATSTAT OUTPUTS	HS6
	▼	HIR	TEXT			OFF/ON	Heat Interlock Relay	Interlock Relay for Terminals	HEATSTAT OUTPUTS	HIR
ECONO	ENTER						Economizer Outputs	Economizer and Power Exh Outputs		
	▼	EC.AP	XXX	%	%	0-100	Econo Damper Current Pos	economizer current position	BLDGPRES CAPACITY ECONWORK ECONDIAG ECONMIN	ECONOPOS
	▼	EC.CP	XXX	%	%	0-100	Econo Damper Command Pos	required economizer position	BLDGPRES ECONWORK ECONDIAG ECONMIN	ECONOCMD
	▼	E.PWR	TEXT	—	—	OFF/ON	Economizer Power Relay	Economizer control power relay status	ECONWORK	ECON_PWR
	▼	PE.A	TEXT	—	—	OFF/ON	Power Exhaust Stage A	Exhaust fan control relay A status	BLDGPRES OUTPUTS	PE_A
	▼	PE.B	TEXT	—	—	OFF/ON	Power Exhaust Stage B	Exhaust fan control relay B status	BLDGPRES OUTPUTS	PE_B
	▼	PE.C	TEXT	—	—	OFF/ON	Power Exhaust Stage C	Exhaust fan control relay C status	BLDGPRES OUTPUTS	PE_C

Table 19 — Configuration Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
UNIT	ENTER	UNIT							Unit Configurations	Overall Unit Configurations		
	▼	CTL.T	X	—	—	4	1	1 = VAV RAT, 2 = VAV SPT 3 = TSTAT MULTI, 4 = TSTAT 2STAGE, 5 = SPT MULTI, 6 = SPT 2STAGE	Unit Control Type	Used to select the type of capacity control	UNIT	CTRLTYPE
	▼	SIZE	XX	TONS	TONS	*	*	20, 25, 27, 30, 35, 40, 50, 60	20,25,27,30,35,40,50,60	used to select the nominal size unit	UNIT	SIZE
	▼	S.ML.V	TEXT	—	—	NO	NO	NO/YES	Minimum Load Valve?	Used to enable the minimum load valve option	COOL_CFG	MLV_SEL
	▼	VS.FN	TEXT	—	—	NO	YES	NO/YES	Variable Speed Fan?	used to enable inverter fan speed control	UNIT	VARSFAN
	▼	IF.M	X	—	—	NONE	NONE	0 = NONE, 1 = SWITCH, 2 = DELTA PRESS	Fan Status Monitoring Type	used to configure the type of fan status monitor. Delta pressure only available on VAV units	SFS_WORK	SFS_MON
	▼	IF.IS	TEXT	—	—	NO	NO	YES/NO	Fan Fail Shuts Down Unit	Action taken if a fan failure is detected FAN.S switch	SFS_WORK	SFS_SHUT
	▼	S.MM	TEXT	—	—	NO	NO	YES/NO	Motormaster Installed?	Used to configure unit to allow for the use of MotorMaster V	UNIT	MM_SEL
	▼	DELY	XX	MIN	MIN	0	0	0 TO 15	Minutes off time	time unit is off before next start	UNIT	DELAY
	▼	MAT.S	TEXT	—	—	YES	YES	YES/NO	Estimate MAT?	Enable routine to estimate mixed air temp, should be set to yes	UNIT, ECONDIAG	MAT_SEL
	▼	R.MAT	TEXT	—	—	NO	NO	YES/NO	Reset MAT Table	Used to reset the mixed air temperature table	EDT_WORK	RSETMATT
	▼	DP.XR	TEXT	—	—	NO	NO	YES/NO	Disch. Press. Transducer	not available at this time	UNIT	DP_TRANS
	▼	FAN.M	X	X	X	0	0	0,1	Fan Mode (0=Auto, 1=Cont)	Used to configure fan operation during occupied periods	CONFIG	FANM
	▼	SAMP	XXX	SEC	SEC	60	60	0 TO 720	VAV Unocc. Fan Retry Time	This controls the sample rate for checking the return air temperature by turning on the fan while in the unoccupied mode.	CONFIG	SAMPMINS
COOL	ENTER	COOL		—	—				Cooling Configuration	Cooling Control Configurations		
	▼	HP.SP	XXX.X	F	C	110	110	80.0 TO 150.0	Head Pressure Setpoint	Setpoint for head pressure control	UNIT	HPSP
	▼	CLOA	XXX.X	F	C	40	40	-20 TO 40	Compressor Lockout Temp	Temperature below which compressors will be locked out	COOL_CFG	OATLCOMP
	▼	C.FOD	XX	SEC	SEC	60	60	0 TO 600	Fan-Off Delay, Mech Cool	Delay in sec to turn off fan when using cyclic indoor fan control in cooling	COOL_CFG	COOL_FOD
	▼	C.TC.F	XX	MIN	MIN	0	0	0 TO 60	TCST Cool Time/Temp Fact	Temperature compensated start configuration which is used to determine advanced start time before occupancy based on the following equation prestart time = (SPT-OC.SP)*KCOOL. 0, disables temperature compensated start	CONFIG	KCOOL
	▼	Z.GN	X.X	—	—	1	1	-10.0 TO 10.0	Capacity Threshold Adjust	capacity control PID loop gain factor, normally set to 1	COOL_CFG	Z_GAIN
	▼	A1.EN	TEXT	—	—	YES	YES	ENBL/DSBL	Enable Compressor A1	Used to disable compressors in case of failure	COOL_CFG	CMPA1ENA
	▼	A2.EN	TEXT	—	—	NO	NO	ENBL/DSBL	Enable Compressor A2	Used to disable compressors in case of failure	COOL_CFG	CMPA2ENA
	▼	B1.EN	TEXT	—	—	YES	YES	ENBL/DSBL	Enable Compressor B1	Used to disable compressors in case of failure	COOL_CFG	CMPB1ENA
	▼	B2.EN	TEXT	—	—	NO	NO	ENBL/DSBL	Enable Compressor B2	Used to disable compressors in case of failure	COOL_CFG	CMOB2ENA
	▼	A1.C.E	TEXT	—	—	YES	YES	ENBL/DSBL	CSB A1 Feedback Alarm	Must be enabled if the compressor is enabled	COOL_CFG	CSB_A1EN
	▼	A2.C.E	TEXT	—	—	NO	NO	ENBL/DSBL	CSB A2 Feedback Alarm	Must be enabled if the compressor is enabled	COOL_CFG	CSB_A2EN
	▼	B1.C.E	TEXT	—	—	YES	YES	ENBL/DSBL	CSB B1 Feedback Alarm	Must be enabled if the compressor is enabled	COOL_CFG	CSB_B1EN
	▼	B2.C.E	TEXT	—	—	NO	NO	ENBL/DSBL	CSB B2 Feedback Alarm	Must be enabled if the compressor is enabled	COOL_CFG	CSB_B2EN

*Size default value is dependent on the size of the unit.

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
HEAT	ENTER			—	—				Heating Configurations	Gas and Electric Heating Configurations		
	▼	HT.TY	X	—	—	NO HEAT	NO HEAT	0 = NO HEAT, 1 = ELECTRIC, 2 = 2-STAGE GAS 3 = STAGED GAS	Heat Type (0,1,2,3)	Used to select the type of heating	HEAT_CFG	HEATTYPE
	▼	N.HST	X	—	—	2 STAGE	2 STAGE	0 = 2 STAGE, 1 = 5 STAGE, 2 = 7 STAGE, 3 = 9 STAGE, 4 = 11 STAGE	Heat Stage Type	Used only for staged gas heat and selects the sequence that will be used	HEAT_CFG	HTSTGTYP
	▼	OCC.H	TEXT	—	—	NO	NO	NO/YES	Occupied Heating Enabled	Enables occupied heating for VAV	HEATSTAT, HEAT_CFG, CONFIG	HTOCCENA
	▼	LAT.M	TEXT			NO	NO	NO/YES	SAT Sensor Sense Heat	Yes = EDT sensor relocated to leaving ductwork which in needed for Linkage heat monitoring	HEATSTAT	HTLATMON
	▼	E.FOD	XX	SEC	SEC	30	30	10 TO 600	Fan-Off Delay, Elec Heat	delay in turning off fans for electric heat	HEAT_CFG	ELEC_FOD
	▼	G.FOD	XX	SEC	SEC	45	45	45 TO 600	Fan-Off Delay, Gas heat	delay in turning off fans for gas heat	HEAT_CFG	GAS_FOD
	▼	H.T.CF	XX	MIN	MIN	0	0	0 TO 60	TCST Heat Time/Temp Fact	Used for temperature compensated start in the heat mode and the prestart time prior to occupancy is calculated by Time = TCST time - Kheat *(ohsp - space temp). 0 Disables the function	CONFIG	KHEAT
	▼	S.CP.M	XX.X	%	%	45	45	5 TO 45	Max Cap Change Per Cycle	Max % capacity that can be added/removed at any time. for staged heat control	HEATSTAT	HTCAPMAX
	▼	S.PI.R	XX	—	—	90	90	60 TO 300	PID Algorithm Rate	Staged gas, normally should not be changed	HEATSTAT	HTSGPIDR
	▼	S.RIS	XX	—	—	90	90	60 TO 300	PID algorithm rate	Staged Gas rise clamp	HEATSTAT	HTSGPIDR
	▼	S.MR.D	X.X	—	—	0.5	0.5	0 TO 5.0	S. Gas DB Min. dF/PID Rate	PID rate of change factor	HEATSTAT	HT_MR_DB
	▼	S.DB	X.X	F	F	2	2	0 TO 5.0	ST.Gas Temp. Dead Band	Deadband where changes will not be made	HEATSTAT	HT_SG_DB
	▼	S.P.GN	X.X	—	—	1	1	0 TO 1.5	Proportional Gain	PID proportional gain factor	HEATSTAT	HT_PGAIN
	▼	S.I.GN	X.X	—	—	1	1	0 TO 1.5	Integral Gain	PID integral gain factor	HEATSTAT	HT_IGAIN
	▼	S.DGN	X.X	—	—	1	1	0 TO 1.5	Derivative Gain	PID derivative gain factor	HEATSTAT	HT_DGAIN
TMPR	ENTER	TMPR							Temperature Configurations	VAV Tempering configurations		
	▼	T.CL	XX	F	C	40	40	-20 TO 40.0	Tempering in Cool SASP	SASP = Supply Air Setpoint while cooling in tempering mode	SET_PNT	TEMPCOOL
	▼	T.VO	XX	F	C	65	65	-20 TO 80	Tempering Vent OCC SASP	SASP = Supply Air Setpoint while in the occupied vent mode	SET_PNT	TEMPVOCC
	▼	T.VU	XX	F	C	50	50	-20 TO 80	Tempr Vent Unocc SASP	SASP = Supply Air Setpoint while in the unoccupied vent mode	SET_PNT	TEMPVUNC
	▼	T.PRG	XX	F	C	50	50	-20 TO 80	Tempering Purge SASP	SASP = Supply Air Setpoint while in the purge mode	SET_PNT	TEMPPURG

*Size default value is dependent on the size of the unit.

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
ECON	ENTER	ECON							Economizer Configurations	Economizer and Exhaust configurations		
	▼	EC.EQ	TEXT	—	—	YES	YES	NO/YES	Economizer Installed?	Used to enable and disable the use of an economizer	UNIT	ECON_ENA
	▼	E.CGO	X	—	—	DIFF. DB.	DIFF. DB.	0 = DRY BULB, 1 = DIFF. DB, 2 = OA ENTHALPY, 3 = DIFF ENTHALPY	Econ Changeover Select	Used to select the type of economizer changeover control	ECONDIAG	ECON_SEL
	▼	E.CTL	X	—	—	DIG/POSITION (do not change)	DIG/POSITION (do not change)	1 = DIG/POSITION, 2 = DIG/COMMAND, 3 = ANALOG CTRL	Economizer Control Type	Used to configure the 4-20 ma output from the ECB1 board where 1 = DIG/POSITION (digital control but sends actual position out 4-20ma output), 2 = DIG/COMMAND (digital control but sends commanded position out 4-2o ma output), 3 = ANALOG CTRL (direct control 4-20 ma signal)	UNIT	ECON_CTL
	▼	MIN.P	XXX	%	%	20	20	0-100%	Economizer Min Position	design occupancy minimum economizer ventilation damper position	BLDGPRES, ECONWORK SET_PNT, AIRQUALT, ECONMIN	ECONOMIN
	▼	OAT.L	XXX.X	F	C	60	60	55 TO 120	High OAT Lockout Temp	lockout economizer free cooling above this ambient. Note applies even when Enthalpy or Dewpoint control being used	ECONWORK, ECONDIAG	OAT_LOCK
	▼	OA.EC	X	—	—	CURVE B	CURVE B	1 = A CURVE, 2 = B CURVE, 3 = C CURVE, 4 = D CURVE, 5 = CUSTOM CURVE	A, B, C, D Curve Select	Economizer changeover curve for enthalpy using A to D curves and a custom curve based on enthalpy and drybulb	ECONWORK, ECONDIAG	OAEC_SEL
	▼	OA.DL	XXX.X	F	C	55	55	50.0 TO 62.0	OA Dewpoint Temp Limit	Above this dewpoint value the economizer is locked out. Used with any changeover control when an outdoor air humidity sensor is present	ECONWORK, ECONDIAG	OADEWCFG
	▼	OEN.C	XXX.X	Btu/lb	kcal/kg	27	27	18.0 TO 28.0	Outdr.Enth Compare Valve	Above this value economizer locked out. Only used with custom curve changeover	ECONWORK, ECONDIAG	OAEN_CFG
	▼	UFC.C	X	—	—	0	0	0 = DISABLED, 1 = UNOCCUPIED, 2 = PREOCCUPANCY	Unocc Free Cool Config	Used to configure unoccupied free cooling	CONFIG	UEFC_CFG
	▼	UFC.T	XXX	MIN	MIN	120	120	0 TO 720	Unocc. Free Cool Time	time before occupied to start free cooling	CONFIG	UEFCTIME
	▼	TRM.E	TEXT	—	—	Enabled	Enabled	ENBL/DSBL	Enable Economizer Trim	Will allow the economizer to be modulated closed when compressors are on to provide better economizer control and less compressor cycling	UNIT	ECTRMENA
	▼	EC.CB	XX.X	F	C	2	2	0.5 TO 5.0	Economizer Temp Deadband	This is an EDT deadband where the economizer will not move when free cooling	ECONWORK	ECONBAND
	▼	PWRX	X	—	—	none	none	0 = NONE 1 = 2 STAGE, 2 = MODULATING	Power Exhaust Type	Used to select the type of power exhaust control	BP_CNTL	PWRX
	▼	PWRM	X	—	—	4	4	1 = 4 MOTORS, 2 = 6 MOTORS	Power Exhaust Motors	Used to select the number of power exhaust fans. 4 on 020-060 units and 6 on 060 units	BP_CNTL	PWRM
	▼	PE1.P	XXX	%	%	35	35	0 TO 100	PE Stage 1 Econo Position	damper position when exhaust stage 1 will turn on	SET_PNT	PE1_POS
	▼	PE2.P	XXX	%	%	75	75	0 TO 100	PE Stage 2 Econo Position	damper position when exhaust stage 2 will turn on	SET_PNT	PE2_POS

*Size default value is dependent on the size of the unit.

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
SVFD	ENTER	SVFD							SF VFD Parameters			
	▼	SP.S	TEXT			DSBL	ENBL	ENBL/DSBL	Duct Static Pressure Sensor	Enables and disables the use of a supply duct pressure sensor	UNIT	SPSENS
	▼	SP.C	X	—	—	none	VFD Control	1 = NONE, 2 = VFD CONTROL	Static Pressure Control	Enables to use of VFD control for building pressure control. Only applies to VAV	CONFIG	STATICFG
	▼	SF.MN	XXX	%	%	20	20	20 TO 40%	IDF VFD Minimum Speed	minimum VFD speed, do not set on inverters which must be set to 0	SFANVFD	SVFD_MIN
	▼	SF.MX	XXX	%	%	100	100	50 TO 100	IDF VFD Maximum Speed	maximum VFD speed	SFANVFD	SVFD_MAX
	▼	SF.FS	XXX	%	%	100	100	0 T0 100	IDF Speed In Fire Mode	VFD speed in fire modes	SFANVFD	SVFD_FSD
	▼	SP.KP	XX.X	—	—	20	20	0.0 TO 100.0	Prop. Gain SF VFD	Control Loop Proportional Gain Factor (do not change)	SFANVFD	SPKP
	▼	SP.KD	X.X	—	—	0	0	0 TO 50.0	Diff. Gain SF VFD	Control Loop Differential Gain Factor (do not change)	SFANVFD	SPKD
	▼	SP.KI	X.X	—	—	2	2	0.0 TO 50.0	Integral Gain SF VFD	Control Loop Integral Gain Factor (do not change)	SFANVFD	SPKI
	▼	SP.K	X.X	—	—	1	1	0.0 TO 50.0	System /gain SF VFD	Control Loop gain Factor (do not change)	SFANVFD	SPK
	▼	SP.DT	XX	sec	sec	2	2	1 TO 200	VFD PID Time (Seconds)	Control Loop PID time Factor (do not change)	SFANVFD	VFD_TIME
	▼	SP.H.L	X.XX	in-H2O	cm-H2O	5	5	-10.0 TO 10.0	Duct Press Sensor HI end	used to set upper range on the supply duct pressure	SENSWORK, SENSCNFG	SP_HIGH
	▼	SP.L.L	X.XX	in-H2O	cm-H2O	0	0	-10.0 TO 10.0	Duct Press Sensor Lo end	used to set the lower range on the supply duct pressure	SENSWORK, SENSCNFG	SP_LOW
BP	ENTER								Building Pressure Params	Building pressure control configurations		
	▼	BP.SL	X	—	—	2	2	1,2,3	Modulating PE Alg Select	1,2,3 use routine 2 (do not change)	BP_CNTL	BPSELECT
	▼	BP.S	TEXT	—	—	DSBL	DSBL	ENBL/DSBL	Building Pressure Sensor	enables the use of the building pressure sensor	UNIT	BPSENS
	▼	BP.R	X.XX	in-H2O	cm-H2O	0.25	0.25	0 TO 1	Bldg Press (+/–) Range	use to set range of sensor (+/– limit)	SENSWORK, SENSCNFG	BP_RANGE
	▼	BP.ZG	XX.X	—	—	1	1	0.1 TO 10	BP Threshold Adjustment	Threshold adjustment (do not change)	BP_CNTL	BPZ_GAIN
	▼	BP.DT	XX	MIN		1	1	1 TO 10	BP PID Evaluation	PID factor (do not change)	BP_CNTL	BPPERIOD
	▼	BP.HP	X.XXX	in-H2O	cm-H2O	0.05	0.05	0 TO 1.0	High BP Level	Building Pressure Upper Differential limit (use with routine 2)	BP_CNTL	BPHPLVL
	▼	BP.LP	X.XXX	in-H2O	cm-H2O	0.04	0.04	0 TO 1.0	Low BP Level	Building Pressure Lower Differential limit (use with routine 2)	BP_CNTL	BPLPLVL

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
IAQ	ENTER								IAQ Configuration	Demand Ventilation Configuration		
	▼	IA.CF	X	—	—	0	0	0 = NO IAQ, 1 = DCV, 2 = OVERRIDE IAQ, 3 = CNTL MIN POS, 4 = MIN POS POT.	IAQ MinPos Sensor Config	Used to configure the use of IAQ control	AIR_QLTY, AIRQUALT	IAQANCFG
	▼	IA.FN	X	—	—	0	0	0 = NEVER, 1 = OCCUPIED, 2 = OVERRIDE IAQ	IAQ 4-20 ma Fan Config	Used to configure IAQ fan control when using the 4-20 ma input	AIR_QLTY, AIRQUALT, ECONMIN	IAQANFAN
	▼	IA.I.C	X	—	—	0	0	0 = NO IAQ, 1 = DCV, 2 = OVERRIDE IAQ	IAQ Discrete Input Config	Used to configure IAQ discrete input	AIR_QLTY, AIRQUALT, ECONMIN	IAQINCFG
	▼	IA.I.F	X	—	—	0	0	0 = NEVER, 1 = OCCUPIED, 2 = ALWAYS	IAQ Disc.In Fan Config	Used to configure fan control when using the IAQ discrete fan input	AIR_QLTY, AIRQUALT, ECONMIN	IAQINFAN
	▼	AQ.MP	XXX	%	%	0	0	0 TO 100	IAQ Demand Vent Min Pos.	minimum position when IAQ below limit	BLDGPRES, ECONWORK, SET_PNT, AIRQUALT, ECONMIN	IAQMINP
	▼	MIN.I	XXX	%	%	20	20	0 TO 100	Economizer Min Position	Economizer minimum occupied position, reference valve should be set in setpoint screen	BLDGPRES, ECONWORK, SET_PNT, AIRQUALT, ECONMIN	ECONOMIN
	▼	PRG.E	TEXT	—	—	DSBL	DSBL	ENBL/DSBL	IAQ Purge	used to enable pre-occupancy purge	CONFIG, AIRQUALT	PURGEN
	▼	PRG.D	XX	MIN	MIN	5	5	5 TO 60	IAQ Purge Duration	This is "how long do we purge."	CONFIG	IQPD
	▼	PG.LT	XXX	%	%	10	10	0 TO 100	IAQ Purge LOTemp Min Pos	low limit on damper position during purge	SET_PNT	LTMP
	▼	PG.HT	XXX	%	%	35	35	0 TO 100	IAQ Purge HITemp Min Pos	high limit on damper position during purge	SET_PNT	HTMP
	▼	OVR.P	XXX	%	%	100	100	0 TO 100	IAQ Econo Override Pos	position of damper when override is in effect	AIR_QLTY, AIRQUALT, ECONMIN	IAQOVPOS
	▼	OA.CF	X	—	—	No OAQ	No OAQ	0 = NO OAQ, 1 = DCV OAQ, 2 = LOKOUT	OAQ 4-20ma Sensor Config	Used to configure OAQ sensor	AIR_ALTY, AIRQUALT, ECONMIN	OAQANCFG
	▼	OAQ.U	XXXX	—	—	400	400	400-2000	User-Configured OAQ	Used to set the reference level for OAQ when there is no OAQ sensor. Should be base on a locally measured value and is typically around 450-550	AIR_QLTY	OAQ_MEAS
	▼	OAQ.L	XXXX	ppm	ppm	0	0	0 TO 2000	OAQ Lockout Value	above this outside air ppm level the dampers will be closed to the min IAQ position	AIR_QLTY, ECONMIN	OAQLOCK
	▼	AQD.L	XXXX	ppm	ppm	100	100	0 TO 1000	Diff.Air Quality LOLimit	ppm level above outside air reference for minimum setting of the IAQ curve	AIR_QLTY, ECONMIN	DAQ_LOW
	▼	AQD.H	XXXX	ppm	ppm	700	700	100 TO 2000	Diff.Air Quality HiLimit	ppm level above outside air reference for maximum setting of the IAQ curve	AIR_QLTY, ECONMIN	DAQ_HIGH
	▼	DF.ON	XXX	ppm	ppm	400	400	0 TO 2000	DAQ PPM Fan On Setpoint	used to control indoor fan on at ppm level	ECONMIN	FAQFNON
	▼	DF.OF	XXX	ppm	ppm	200	200	0 TO 2000	DAQ PPM Fan Off Setpoint	used to control indoor fan off at ppm level	AIR_QLTY, ECONMIN	DAQFNOFF
	▼	I.4M	XXXX	ppm	ppm	0	0	0 TO 5000	IAQ Low Reference	used with remoted 4-20ma IAQ and is the ppm level at 4 ma	SENSWORK, AIRQUALT, ECONMIN	IAQREFL
	▼	I.20M	XXXX	ppm	ppm	2000	2000	0 TO 5000	IAQ High Reference	used with remote 4-20ma IAQ and is the ppm level at 20 ma	SENSWORK, AIRQUALT, ECONMIN	IAQREFH
	▼	O.4M	XXXX	ppm	ppm	0	0	0 TO 5000	OAQ Low Reference	used with remoted 4-20ma OAQ and is the ppm level at 4 ma	SENSWORK, AIRQUALT, ECONMIN	IAQREFL
	▼	O.20M	XXXX	ppm	ppm	2000	2000	0 TO 5000	OAQ High Reference	used with remote 4-20ma OAQ and is the ppm level at 20 ma	SENSWORK, AIRQUALT, ECONMIN	IAQREFH
	▼	I.CRV	XXX	ppm	ppm	0	0	-5.0 to 5.0	Diff.IAQ Responsiveness	IAQ control curve responsiveness setting	AIR_QLTY, ECONMIN	IAQREACT

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
OPTS	ENTER	OPTS							Option Sensor Config	Option sensor configurations		
	▼	EDT.R	TEXT	—	—	DSBL	DSBL	ENBL/DSBL	EDT Reset Input	enable remote reset signal feature	UNIT	EDTRSENS
	▼	ECO.S	X	—	—	NONE	NONE	0 = NONE, 1 = ECON ENABLE, 2 = POSITION OVERRIDE	Economizer Switch	Used to configure the use of an economizer switch and how it will be used	UNIT	ECOSWCFG
	▼	FLS.E	TEXT	—	—	DSBL	DSBL	ENBL/DSBL	Filter Stat.SW. Enabled?	enable remote filter status switch use	FLTSWORK, UNIT	FLTS_ENA
	▼	SPT.S	TEXT	—	—	DSPL	DSPL	ENBL/DSBL	Space Temp Sensor	enable use of T55, T56, T58 sensor	UNIT	SPTSENS
	▼	STO.S	TEXT	—	—	DSPL	DSPL	ENBL/DSBL	Space Temp Offset	Enable the use of T56 sensor offset feature	UNIT	SPTOSENS
	▼	STO.R	X	F	C	5	5	1 TO 10	SPT Offset Range (+/-)	range for Offset feature adjustment	UNIT	SPTO_RNG
	▼	R.RH.S	TEXT	—	—	DSBL	DSBL	ENBL/DSBL	Return Air RH Sensor	enable the use of the return air humidity sensor	ENTHALPY, UNIT	RARHSENS
	▼	O.RH.S	TEXT	—	—	DSBL	DSBL	ENBL/DSBL	Outside Air RH Sensor	enable the use of an outside air humidity sensor	ENTHALPY, UNIT	OARHSENS
	▼	DMT.S	TEXT	—	—	DSBL	DSBL	ENBL/DSBL	Demand Limit Input	enable the use of demand limit switch inputs	UNIT, DMDLIMIT	DEMLSENS
	▼	RMT.C	X	—	—	NONE	NONE	0 = NONE, 1 = OCCUPANCY, 2 = START STOP	Remote Switch Config	Used to configure the remote control switch and how it will be used	SCHEDOVR	RMTINCFG
CMF.D	ENTER		TEXT						Comfort Demand Config	Demand Control Setpoints		
	▼	LC.ON	XXX.X	F	C	1.5	1.5	-1 TO 2.0	DMD Level Lo Cool On	Used for Demand Driven Control Logic	CDMD_CFG	DMDLCON
	▼	LC.OF	XXX.X	F	C	1	1	0.5 TO 2.0	DMD Level (-) Lo Cool Off	Used for Demand Driven Control Logic	CDMD_CFG	DMDLCOFF
	▼	HC.ON	XXX.X	F	C	0.5	0.5	0.5 TO 2.0	DMD Level(+) Hi Cool On	Used for Demand Driven Control Logic	CDMD_CFG	DMDHCON
	▼	LH.ON	XXX.X	F	C	1.5	1.5	-1 TO 2.0	DMD Level Lo Heat On	Used for Demand Driven Control Logic	CDMD_CFG	DMDLHON
	▼	LH.OF	XXX.X	F	C	1	1	0.5 TO 2.0	DMD Level (-) Low Heat Off	Used for Demand Driven Control Logic	CDMD_CFG	DMDLHOFF
	▼	HH.ON	XXX.X	F	C	0.5	0.5	0.5 TO 2.0	DMD Level (+) Hi Heat On	Used for Demand Driven Control Logic	CDMD_CFG	DMDHHON
	▼	CT.LV	XXX.X	F	C	0.1	0.1	0.1 TO 5	Cool Trend Demand Level	Trend Temperature adjustment for demand cooling	COOL_CFG	CTRENDLV
	▼	CT.TM	XX	sec	sec	60	60	30 TO 600	Cool Trend Time (secs)	Trend time adjustment for demand cooling	COOL_CFG	CTRENDTM
	▼	HT.LV	XXX.X	F	C	0.1	0.1	0.1 TO 5	Heat Trend Demand Level	Trend Temperature adjustment for demand heating	HEAT_CFG	HTRENDLV
	▼	HT.TM	XX	sec	sec	60	60	30 TO 600	Heat Trend Time (sec)	Trend time adjustment for demand heating	HEAT_CFG	HTRENDTM
RST	ENTER	RST							Supply Air Reset Config	Supply air reset configurations		
	▼	RST.T	X	—	—	NONE	NONE	0 = NO RESET, 1 = SPT RESET, 2 = RAT RESET, 3 = 3RD PART RESET	Supply Air Reset Type	Configure the type of supply air reset	SET_PNT	SARSTCFG
	▼	RTIO	X.X	—	—	3	3	0.0 TO 10.0	Reset Ratio	Used for supply air reset control	SET_PNT	RTIO
	▼	R.LIM	XX.X	F	C	10	10	0 TO 20.0	Reset Limit	used for supply air reset control	SET_PNT	LIMT

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
DMD.L	ENTER								Demand Limit Config			
	▼	DM.L.S	X	—	—	NONE	NONE	0 = NO DEMAND LIMIT 1 = SWITCH, 2 = 4-20MA, 3 = CCN LOADSHED	Demand Limit Select	Used to configure demand limiting options	DMD_LIM, DMDLIMIT	DMD_CTRL
	▼	D.L.20	XXX	%	%	100	100	0-100	Demand Limit at 20 ma	% demand limit at a 20 ma demand signal	DMD_LIM, DMDLIMIT	DMT20MA
	▼	LS.GN	XXX	—	—	0	0	0 TO 99	Loadshed Group Number	CCN loadshed group	DMD_LIM, DMDLIMIT	SHED_NUM
	▼	LS.DD	XXX	%	%	0	0	0 TO 60	Loadshed Demand Delta	Used for CCN Loadshed	DMD_LIM, DMDLIMIT	SHED_DEL
	▼	LS.TM	XX	MIN	MIN	60	60	0 TO 120	Maximum Loadshed Time	Used for CCN Loadshed	DMD_LIM, DMDLIMIT	SHED_TIM
	▼	DLS.1	XX	%	%	80	80	0 to 100	Demand Limit SW.1 Setpt	external switch controlled demand limit setpoint	DMD_LIM, DMDLIMIT	DLSWSP1
	▼	DLS.2	XX	%	%	50	50	0 to 100	Demand Limit SW.2 Setpt	external switch controlled demand limit setpoint	DMD_LIM, DMDLIMIT	DLSWSP2
CCN	ENTER	CCN							CCN Configuration			
	▼	CCN.A	X	—	—	1	1	1 TO 239	CCN Address	CCN Unit address number	BRODEFS	CCNADD
	▼	CCN.B	X	—	—	0	0	0 TO 239	CCN Bus Number	CCN bus number	BRODEFS	CCNBUS
	▼	BAUD	XXXX	BITS/SEC	BITS/SEC	9600	9600	2400, 4800, 9600, 19200, 38400	CCN Baud Rate	1=2400, 2=4800, 3=9600, 4=19200, 5=38400 CCN communication speed	BRODEFS	CCNBAUDD
	▼	B.TIM	TEXT	—	—	OFF	OFF	ON/OFF	CCN Time/Date Broadcast	enable CCN Time/Date broadcast	BRODEFS	CCNBC
	▼	B.OAT	TEXT	—	—	OFF	OFF	ON/OFF	CCN OAT Broadcast	enable CCN OAT broadcast	BRODEFS	OATBC
	▼	B.ORH	TEXT	—	—	OFF	OFF	ON/OFF	CCN OARH Broadcast	enable CCN OARH broadcast	BRODEFS	OARHBC
	▼	B.OAQ	TEXT	—	—	OFF	OFF	ON/OFF	CCN OAQ Broadcast	enable CCN OAQ broadcast	BRODEFS	OAQBC
	▼	B.GS	TEXT	—	—	OFF	OFF	ON/OFF	Global Schedule Broadcast	enable CCN schedule broadcast	BRODEFS	GSBC
	▼	B.ACK	TEXT	—	—	OFF	OFF	ON/OFF	CCN Broadcast ACK'ER	enable CCN ACK'ER broadcast	BRODEFS	CCNCACK

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
DISP	ENTER								Display Configuration			
	▼	METR	TEXT	—	—	OFF	OFF	ON/OFF	Metric Display	enable metric unit display	DISPLAY	DISPUNIT
	▼	LANG	TEXT	—	—	ENGLISH	ENGLISH	ENGLISH, SPANISH, FRENCH, PORTUGUESE	Language Select	Only English at this time	DISPLAY	LANGUAGE
	▼	PROT	TEXT	—	—	ENBL	ENBL	ENBL/DSBL	Password Enable	enable/disable password protection	DISPLAY	PASS_EBL
	▼	PSWD	XXXX	—	—	1111	1111	0 TO 9999	Password Protection Must be disabled to change Password	enter password	DISPLAY	PASSWORD
	▼	TEST	TEXT	—	—	OFF	OFF	ON/OFF	Test Display LEDs	used to check the operation of the display segments	DISPLAY	DISPTEST
SW.LG	ENTER	SW.LG							Switch Logic NO/NC	No= normally open, NC=normally closed		
	▼	DM.1.L	TEXT			OPEN	OPEN	OPEN/CLSE	DMD.LMT.SW.1 Normally:	unpower status configuration of demand limit switch 1	DISLOGIC	DMD_SW1L
	▼	DM.2.L	TEXT			OPEN	OPEN	OPEN/CLSE	DMD.LMT.SW.2 Normally:	unpower status configuration of demand limit switch 2	DISLOGIC	DMD_SW2L
	▼	EC.SL	TEXT			OPEN	OPEN	OPEN/CLSE	Economiz Switch Normally:	unpower status configuration of remote economizer enable switch	DISLOGIC	ECOSWLOG
	▼	EVC.L	TEXT			OPEN	OPEN	OPEN/CLSE	Evacuation SW Normally:	unpower status configuration of fire evacuation switch	DISLOGIC	EVACLOGC
	▼	FTS.L	TEXT			OPEN	OPEN	OPEN/CLSE	Filter Status Normally:	unpower status configuration of filter status switch	DISLOGIC	FLTSLOGC
	▼	FSD.L	TEXT			OPEN	OPEN	OPEN/CLSE	Fire Shutdown Normally:	unpower status configuration of fire shutdown switch	DISLOGIC	FSDLOGIC
	▼	IAQ.L	TEXT			OPEN	OPEN	OPEN/CLSE	IAQ Disc. Input Normally:	unpower status configuration of IAQ override switch	DISLOGIC	IAQINLOG
	▼	PRS.L	TEXT			OPEN	OPEN	OPEN/CLSE	Press. Switch Normally:	unpower status configuration of fire pressurization switch	DISLOGIC	PRESLOGC
	▼	PRG.L	TEXT			OPEN	OPEN	OPEN/CLSE	Smoke Purge SW. Normally:	unpower status configuration of fire purge switch	DISLOGIC	PURGLOGC
	▼	PMI.L	TEXT			OPEN	OPEN	OPEN/CLSE	Remote Switch Normally:	unpower status configuration of remote control switch	DISLOGIC	RMTINLOG
	▼	SFS.L	TEXT			OPEN	OPEN	OPEN/CLSE	Fan Status SW. Normally:	unpower status configuration of fan status pressure switch	DISLOGIC	SFSLOGIC

Table 19 — Configuration Display Menu (cont)

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
ALLM	ENTER	ALLM							Alert Limit Config	Used to configure limits of limit alerts		
	▼	SPL.O	XXX.X	F	C	65.0	65.0	-10.0 TO 245.0	SPT LO Alert Limit/Occ	low space temperature alert limit (occupied mode)	ALRTLMTS	SPLO
	▼	SPH.O	XXX.X	F	C	80.0	80.0	-10.0 TO 245.0	SPT HI Alert Limit/Occ	High space temperature alert limit (occupied mode)	ALRTLMTS	SPHO
	▼	SPL.U	XXX.X	F	C	45.0	45.0	-10.0 TO 245.0	SPT LO Alert Limit/Unocc	low space temperature alert limit (unoccupied mode)	ALRTLMTS	SPLU
	▼	SPH.U	XXX.X	F	C	100.0	100.0	-10.0 TO 245.0	SPT HI Alert Limit/Unocc	High space temperature alert limit (unoccupied mode)	ALRTLMTS	SPHU
	▼	SAL.O	XXX.X	F	C	45.0	45.0	-10.0 TO 245.0	SAT LO Alert Limit/Occ	Low Supply air temperature alert limit (occupied mode)	ALRTLMTS	SAL
	▼	SAH.O	XXX.X	F	C	180.0	180.0	-10.0 TO 245.0	SAT HI Alert Limit Occ	High Supply air temperature limit (occupied mode)	ALRTLMTS	SAH
	▼	SAL.U	XXX.X	F	C	45.0	45.0	-10.0 TO 245.0	SAT LO Alert Limit/Unocc	Low Supply air temperature alert limit (unoccupied mode)	ALRTLMTS	SALU
	▼	SAH.U	XXX.X	F	C	180.0	180.0	-10.0 TO 245.0	SAT HI Alert Limit/Unocc	High Supply air temperature limit (unoccupied mode)	ALRTLMTS	SALH
	▼	RAL.O	XXX.X	F	C	60.0	60.0	-10.0 TO 245.0	RAT LO Alert Limit/Occ	Low return air temperature alert limit (occupied mode)	ALRTLMTS	RAL
	▼	RAH.O	XXX.X	F	C	90.0	90.0	-10.0 TO 245.0	RAT HI Alert Limit/Occ	Low return air temperature limit (occupied mode)	ALRTLMTS	RAH
	▼	RAL.U	XXX.X	F	C	35.0	35.0	-10.0 TO 245.0	RAT LO Alert Limit/Unocc	Low return air temperature alert limit (unoccupied mode)	ALRTLMTS	RALU
	▼	RAH.U	XXX.X	F	C	120.0	120.0	-10.0 TO 245.0	RAT HI Alert Limit/Unocc	Low return air temperature limit (unoccupied mode)	ALRTLMTS	RAHU
	▼	IRH.L	XXX	%	%	0	0	0 TO 100%	RH Low Alert Limit	return air humidity low alert limit	ALRTLMTS	RHL
	▼	IRH.H	XXX	%	%	100	100	0 TO 100%	RH High Alert Limit	return air humidity high alert limit	ALRTLMTS	RHH
	▼	DP.L	X.XX	H2O	pa	0	0	0.0 TO 5.0	SP Low Alert Limit	Supply air pressure low level alert limit	ALRTLMTS	SPL
	▼	DP.H	X.XX	H2O	pa	2	2	0.0 TO 5.0	SP High Alert Limit	Supply air pressure high level alert limit	ALRTLMTS	SPH
	▼	BP.L	X.XX	H2O	pa	-0.25	-0.25	-.26 TO.26	BP Low Alert Limit	Building pressure low alert limit	ALRTLMTS	BPLO
	▼	BP.H	X.XX	H2O	pa	0.25	0.25	-.26 TO.26	BP High Alert Limit	Building pressure high alert limit	ALRTLMTS	BPHI
	▼	IQ.HI	XXX	ppm	ppm	800	800	0 TO 5000	IAQ High Alert Limit	Indoor air IAQ high alert limit	ALRTLMTS	IAQL

Table 20 — Timeclock Display Menu

SUBMODE	SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS ENGLISH	FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
						VAV	CV					
TIME		ENTER	TIME	XX:XX				00.00 TO 23.50	Hours and Minutes	Military (00.00-23.59)	CONTROLLER-TIME	TIME
DATE		ENTER	DATE						Current Date			
		▼	MNTH	MONTH	—	—	—	JAN.-DEC	Month of Year	Current Month, i.e., JANUARY	CONTROLLER-TIME	MOY
		▼	DOM	XX	—	—	—	31-Jan	Day of Month	Range 1-31	CONTROLLER-TIME	DOM
		▼	YEAR	XXXX	—	—	—	2003...	Year	2003, 2004, etc	CONTROLLER-TIME	YOCDISP
		▼	DOW	TEXT	—	—	—	1-7	Day of Week	1 = Monday, 2 = Tuesday, 3 = Wednesday, 4 = Thursday, 5 = Friday, 6 = Saturday, 7 = Sunday	CONTROLLER-TIME	DOWDISP
DST		ENTER	DIST						Daylight Savings Config			
		▼	STR.M	XX	month	4	4	1-12	DST Start Month		BRODEFS	STARTM
		▼	STR.W	XX	week	1	1	1-52	DST Start Week		BRODEFS	STARTW
		▼	STR.D	XX	day	7	7	1-7	DST Start Day		BRODEFS	STARTD
		▼	M.ADD	XX	min	60	60	0-1440	DST Minutes to Add		BRODEFS	MINADD
		▼	STP.M	XX	month	10	10	1-12	DST Stop Month		BRODEFS	STOPM
		▼	STP.W	XX	week	5	5	1-52	DST Stop Week		BRODEFS	STOPW
		▼	STP.D	XX	day	7	7	1-7	DST Stop Day		BRODEFS	STOPPD
		▼	M.SUB	XX	min	60	60	0-1440	DST Minutes to Subtract		BRODEFS	MINSUB
SCH.N		ENTER	SCHN	XX	—	0	0	1-99	Schedule Number	0=Always Occupied 1-64 = Local Schedule 65-99 = Global Schedules	SCHEDOVR	SCHEDNUM
OVR.S		ENTER	OVR.S	TEXT	—	YES	YES	YES/NO	SPT Override Enabled	YES/NO	SCHEDOVR	SPT_OVER
OVR.T		ENTER	OVR.T	TEXT	—	YES	YES	YES/NO	T58 Override Enabled?	YES/NO	SCHEDOVR	T58_OVER
OVR.G		ENTER	OVR.G	TEXT	—	NO	NO	YES/NO	Global Sched. Override?	YES/NO	SCHEDOVR	GLBLOVER
OTL		ENTER	OTL	X	hrs	1	1	1-24	Override Time Limit		SCHEDOVR	OTL

Table 20 — Timeclock Display Menu (cont)

SUBMODE	SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS ENGLISH	FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
						VAV	CV					
SCH.L		ENTER							Local Occupancy Schedule			
		ENTER							Occupancy Period 1			
		▼	OCC.1	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER1_OCC
		▼	UNC.1	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER1_UNC
		▼	MON.1	TEXT	—	NO	NO	YES/NO	Monday In Period	YES/NO	TIME-SCHD	PER1MON
		▼	TUE.1	TEXT	—	NO	NO	YES/NO	Tuesday In Period	YES/NO	TIME-SCHD	PER1TUE
	PER.1	▼	WED.1	TEXT	—	NO	NO	YES/NO	Wednesday In Period	YES/NO	TIME-SCHD	PER1WED
		▼	THU.1	TEXT	—	NO	NO	YES/NO	Thursday In Period	YES/NO	TIME-SCHD	PER1THU
		▼	FRI.1	TEXT	—	NO	NO	YES/NO	Friday In Period	YES/NO	TIME-SCHD	PER1FRI
		▼	SAT.1	TEXT	—	NO	NO	YES/NO	Saturday In Period	YES/NO	TIME-SCHD	PER1SAT
		▼	SUN.1	TEXT	—	NO	NO	YES/NO	Sunday In Period	YES/NO	TIME-SCHD	PER1SUN
		▼	HOL.1	TEXT	—	NO	NO	YES/NO	Holiday In Period	YES/NO	TIME-SCHD	PER1HOL
		ENTER							Occupancy Period 2			
		▼	OCC.2	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER2_OCC
		▼	UNC.2	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER2_UNC
		▼	MON.2	TEXT	—	NO	NO	YES/NO	Monday In Period		TIME-SCHD	PER2MON
		▼	TUE.2	TEXT	—	NO	NO	YES/NO	Tuesday In Period		TIME-SCHD	PER2TUE
	PER.2	▼	WED.2	TEXT	—	NO	NO	YES/NO	Wednesday In Period		TIME-SCHD	PER2WED
		▼	THU.2	TEXT	—	NO	NO	YES/NO	Thursday In Period		TIME-SCHD	PER2THU
		▼	FRI.2	TEXT	—	NO	NO	YES/NO	Friday In Period		TIME-SCHD	PER2FRI
		▼	SAT.2	TEXT	—	NO	NO	YES/NO	Saturday In Period		TIME-SCHD	PER2SAT
		▼	SUN.2	TEXT	—	NO	NO	YES/NO	Sunday In Period		TIME-SCHD	PER2SUN
		▼	HOL.2	TEXT	—	NO	NO	YES/NO	Holiday In Period		TIME-SCHD	PER2HOL

Table 20 — Timeclock Display Menu (cont)

SUBMODE	SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS ENGLISH	FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
						VAV	CV					
SCH.L (cont)		ENTER							Local Occupancy Schedule			
	PER.3	ENTER							Occupancy Period 3			
		▼	OCC.3	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER3_OCC
		▼	UNC.3	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER3_UNC
		▼	MON.3	TEXT	—	NO	NO	YES/NO	Monday In Period	YES/NO	TIME-SCHD	PER3MON
		▼	TUE.3	TEXT	—	NO	NO	YES/NO	Tuesday In Period	YES/NO	TIME-SCHD	PER3TUE
		▼	WED.3	TEXT	—	NO	NO	YES/NO	Wednesday In Period	YES/NO	TIME-SCHD	PER3WED
		▼	THU.3	TEXT	—	NO	NO	YES/NO	Thursday In Period	YES/NO	TIME-SCHD	PER3THU
		▼	FRI.3	TEXT	—	NO	NO	YES/NO	Friday In Period	YES/NO	TIME-SCHD	PER3FRI
		▼	SAT.3	TEXT	—	NO	NO	YES/NO	Saturday In Period	YES/NO	TIME-SCHD	PER3SAT
		▼	SUN.3	TEXT	—	NO	NO	YES/NO	Sunday In Period	YES/NO	TIME-SCHD	PER3SUN
		▼	HOL.3	TEXT	—	NO	NO	YES/NO	Holiday In Period	YES/NO	TIME-SCHD	PER3HOL
	PER.4	ENTER							Occupancy Period 4			
		▼	OCC.4	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER4_OCC
		▼	UNC.4	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER4_UNC
		▼	MON.4	TEXT	—	NO	NO	YES/NO	Monday In Period		TIME-SCHD	PER4MON
		▼	TUE.4	TEXT	—	NO	NO	YES/NO	Tuesday In Period		TIME-SCHD	PER4TUE
		▼	WED.4	TEXT	—	NO	NO	YES/NO	Wednesday In Period		TIME-SCHD	PER4WED
		▼	THU.4	TEXT	—	NO	NO	YES/NO	Thursday In Period		TIME-SCHD	PER4THU
		▼	FRI.4	TEXT	—	NO	NO	YES/NO	Friday In Period		TIME-SCHD	PER4FRI
		▼	SAT.4	TEXT	—	NO	NO	YES/NO	Saturday In Period		TIME-SCHD	PER4SAT
		▼	SUN.4	TEXT	—	NO	NO	YES/NO	Sunday In Period		TIME-SCHD	PER4SUN
		▼	HOL.4	TEXT	-—	NO	NO	YES/NO	Holiday In Period		TIME-SCHD	PER4HOL

Table 20 — Timeclock Display Menu (cont)

SUBMODE	SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS ENGLISH	FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
						VAV	CV					
SCH.L (cont)		ENTER							Local Occupancy Schedule			
	PER.5	ENTER							Occupancy Period 5			
		▼	OCC.5	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER5_OCC
		▼	UNC.5	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER5_UNC
		▼	MON.5	TEXT	—	NO	NO	YES/NO	Monday In Period	YES/NO	TIME-SCHD	PER5MON
		▼	TUE.5	TEXT	—	NO	NO	YES/NO	Tuesday In Period	YES/NO	TIME-SCHD	PER5TUE
		▼	WED.5	TEXT	—	NO	NO	YES/NO	Wednesday In Period	YES/NO	TIME-SCHD	PER5WED
		▼	THU.5	TEXT	—	NO	NO	YES/NO	Thursday In Period	YES/NO	TIME-SCHD	PER5THU
		▼	FRI.5	TEXT	—	NO	NO	YES/NO	Friday In Period	YES/NO	TIME-SCHD	PER5FRI
		▼	SAT.5	TEXT	—	NO	NO	YES/NO	Saturday In Period	YES/NO	TIME-SCHD	PER5SAT
		▼	SUN.5	TEXT	—	NO	NO	YES/NO	Sunday In Period	YES/NO	TIME-SCHD	PER5SUN
		▼	HOL.5	TEXT	—	NO	NO	YES/NO	Holiday In Period	YES/NO	TIME-SCHD	PER5HOL
	PER.6	ENTER							Occupancy Period 6			
		▼	OCC.6	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER6_OCC
		▼	UNC.6	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER6_UNC
		▼	MON.6	TEXT	—	NO	NO	YES/NO	Monday In Period		TIME-SCHD	PER6MON
		▼	TUE.6	TEXT	—	NO	NO	YES/NO	Tuesday In Period		TIME-SCHD	PER6TUE
		▼	WED.6	TEXT	—	NO	NO	YES/NO	Wednesday In Period		TIME-SCHD	PER6WED
		▼	THU.6	TEXT	—	NO	NO	YES/NO	Thursday In Period		TIME-SCHD	PER6THU
		▼	FRI.6	TEXT	—	NO	NO	YES/NO	Friday In Period		TIME-SCHD	PER6FRI
		▼	SAT.6	TEXT	—	NO	NO	YES/NO	Saturday In Period		TIME-SCHD	PER6SAT
		▼	SUN.6	TEXT	—	NO	NO	YES/NO	Sunday In Period		TIME-SCHD	PER6SUN
		▼	HOL.6	TEXT	—	NO	NO	YES/NO	Holiday In Period		TIME-SCHD	PER6HOL

Table 20 — Timeclock Display Menu (cont)

SUBMODE	SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS ENGLISH	FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
						VAV	CV					
SCH.L (cont)		ENTER							Local Occupancy Schedule			
	PER.7	ENTER							Occupancy Period 7			
		▼	OCC.7	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER7_OCC
		▼	UNC.7	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER7_UNC
		▼	MON.7	TEXT	—	NO	NO	YES/NO	Monday In Period	YES/NO	TIME-SCHD	PER7MON
		▼	TUE.7	TEXT	—	NO	NO	YES/NO	Tuesday In Period	YES/NO	TIME-SCHD	PER7TUE
		▼	WED.7	TEXT	—	NO	NO	YES/NO	Wednesday In Period	YES/NO	TIME-SCHD	PER7WED
		▼	THU.7	TEXT	—	NO	NO	YES/NO	Thursday In Period	YES/NO	TIME-SCHD	PER7THU
		▼	FRI.7	TEXT	—	NO	NO	YES/NO	Friday In Period	YES/NO	TIME-SCHD	PER7FRI
		▼	SAT.7	TEXT	—	NO	NO	YES/NO	Saturday In Period	YES/NO	TIME-SCHD	PER7SAT
		▼	SUN.7	TEXT	—	NO	NO	YES/NO	Sunday In Period	YES/NO	TIME-SCHD	PER7SUN
		▼	HOL.7	TEXT	—	NO	NO	YES/NO	Holiday In Period	YES/NO	TIME-SCHD	PER7HOL
	PER.8	ENTER							Occupancy Period 8			
		▼	OCC.8	XX:XX	time	00.00	00.00	00:00-23:59	Period Occupancy Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER8_OCC
		▼	UNC.8	XX:XX	time	00.00	00.00	00:00-23:59	Period Unoccupied Time	Range = 00:00 to 23:59; Default = 00:00	TIME-SCHD	PER8_UNC
		▼	MON.8	TEXT	—	NO	NO	YES/NO	Monday In Period		TIME-SCHD	PER8MON
		▼	TUE.8	TEXT	—	NO	NO	YES/NO	Tuesday In Period		TIME-SCHD	PER8TUE
		▼	WED.8	TEXT	—	NO	NO	YES/NO	Wednesday In Period		TIME-SCHD	PER8WED
		▼	THU.8	TEXT	—	NO	NO	YES/NO	Thursday In Period		TIME-SCHD	PER8THU
		▼	FRI.8	TEXT	—	NO	NO	YES/NO	Friday In Period		TIME-SCHD	PER8FRI
		▼	SAT.8	TEXT	—	NO	NO	YES/NO	Saturday In Period		TIME-SCHD	PER8SAT
		▼	SUN.8	TEXT	—	NO	NO	YES/NO	Sunday In Period		TIME-SCHD	PER8SUN
		▼	HOL.8	TEXT	—	NO	NO	YES/NO	Holiday In Period		TIME-SCHD	PER8HOL

Table 20 — Timeclock Display Menu (cont)

SUBMODE	SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS ENGLISH	FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
						VAV	CV					
HOL.G		ENTER	HOL.G	TEXT		YES	YES	YES/NO	Accept Global Holidays	Default = Yes	SCHEDOVR	HOLIDAYT
HOL.L		ENTER							Local Holiday Schedule			
		ENTER							Holiday 1			
	HOL.1	▼	MTH.1	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON01
		▼	DAY.1	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY01
		ESCAPE	LEN.1	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN01
		ENTER							Holiday 2			
	HOL.2	▼	MTH.2	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON02
		▼	DAY.2	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY02
		ESCAPE	LEN.2	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN02
		ENTER							Holiday 3			
	HOL.3	▼	MTH.3	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON03
		▼	DAY.3	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY03
		ESCAPE	LEN.3	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN03
		ENTER							Holiday 4			
	HOL.4	▼	MTH.4	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON04
		▼	DAY.4	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY04
		ESCAPE	LEN.4	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN04
		ENTER							Holiday 5			
	HOL.5	▼	MTH.5	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON05
		▼	DAY.5	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY05
		ESCAPE	LEN.5	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN05
		ENTER							Holiday 6			
	HOL.6	▼	MTH.6	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON06
		▼	DAY.6	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY06
		ESCAPE	LEN.6	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN06

Table 20 — Timeclock Display Menu (cont)

SUBMODE	SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	UNITS ENGLISH	FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
						VAV	CV					
HOL.G		ENTER	HOL.G	TEXT		YES	YES	YES/NO	Accept Global Holidays	Default = Yes	SCHEDOVR	HOLIDAYT
HOL.L (cont)	HOL.7	ENTER							Holiday 7			
		▼	MTH.7	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON07
		▼	DAY.7	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY07
		ESCAPE	LEN.7	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN07
	HOL.8	ENTER							Holiday 8			
		▼	MTH.8	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON08
		▼	DAY.8	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY08
		ESCAPE	LEN.8	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN08
	HOL.9	ENTER							Holiday 9			
		▼	MTH.9	XX	month	0	0	1-12	Holiday Start Month	Range = 1-12	TIME-SCHD	HOLMON09
		▼	DAY.9	X	day	0	0	1-7	Holiday Start Day	Range = 1-31	TIME-SCHD	HOLDAY09
		ESCAPE	LEN.9	XX	day	0	0	0-99	Holiday Duration (Days)	Range = 0-99	TIME-SCHD	HOLLEN09

Table 21 — Operating Mode Display Menu

SUBMODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENTS
MODE	ENTER	MODE	MODE	Modes Controlling Unit	
	▼	COOL	COOL	Cool Mode	Cooling Mode in effect
	▼	HEAT	HEAT	Heat Mode	Heating Mode in effect
	▼	VENT	VENT	Vent Mode	Unit is between heating and cooling mode limits
		TMPR	TMPR	Supply Air Tempering	
	▼	OCC	OCC	Currently Occupied	unit in occupied mode
	▼	T.OVR	T.OVR	Timed Override in Effect	unit operating under timed override
	▼	A.DCV	A.DCV	DCV Resetting Min Pos	DCV resetting economizer position
	▼	SAT.R	SAT.R	Supply air Reset	supply air reset being used
	▼	DMD.L	DMD.L	Demand Limit in Effect	unit being demand limited
	▼	T.C.ST	TCST	Temp. Compensated Start	Temp compensated start being used
	▼	IAQ.P	IAQ.P	IAQ Pre-Occ Purge Active	IAQ pre-purge
	▼	F.CL	F.CL	Unocc Econ Free Cooling	unoccupied economizer free cooling
	▼	F.SD	F.SD	Fire Shutdown	fire shutdown
	▼	PRES	PRES	Pressurization	fire pressurization — supply fan on, economizer closed, exhaust off
	▼	EVAC	EVAC	Evacuation	fire evacuation — exhaust on, economizer open, supply fan off
	▼	SMK.P	SMK.P	Smoke Purge	fire smoke purge — supply fan on, exhaust fan on, economizer open
	▼	STAT	STAT	Thermostat Control	Thermostat control
	▼	LINK	LINK	Linkage Active - DAV	DAV control
	▼	TEST	TEST	Test Mode Active	test mode active
	▼	FS.OV	FS.OV	Fire Speed Override	fire speed setting being used to control supply fan and inverter

Table 22 — Alarm Menu

SUBMODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENTS
CURR	ENTER	AXXX, PXXX, or TXXX	Current Active Alarms	Alarms are shown as AXXX Alerts are shown as TXXX, Pre-Alert shown as PXXX
R.CURR	ENTER	YES/NO	Reset All current Alarms	Resets current alarms
HIST	ENTER	AXXX, PXXX, or TXXX	Alarm History	Alarms are shown as AXXX Alerts are shown as TXXX, Pre-Alert shown as PXXX
R.HIS	ENTER	YES/NO	Reset Alarm History	Clears alarm history

Modes — The system mode is the highest level mode and defines three possible states, OFF, RUN and TEST. Below the RUN mode is the HVAC mode, which includes all the operational modes of the unit. There are 12 HVAC modes and one mode will be in effect whenever the unit is in the run mode. While in one of the HVAC modes, there can be additional operational modes which may also be displayed in the Scrolling Marquee mode display (see the Table 21).

The Mode or Modes that are in effect will be shown on the Auto Rotating Display and also in the Mode Level Display. The structure of the various modes is shown in Fig. 21.

SYSTEM MODE — OFF — When the system mode is off, all outputs are shut down and no machine control is possible.

The conditions that may cause this mode are in the following hierarchical order:

1. Unit commanded off using the STOP software variable which can be changed using the SERVICE TEST submenu.
2. Wake up timer on a power reset.
3. Unit Stop (software application level variable that acts as a hard shut down — UNITSTOP).
4. Fire Shut Down (traumatic fire shutdown condition based on Fire Shutdown Input (FDWN).
5. CCN Emergency Stop, which is a standard CCN variable forced over the network through the Emergency Stop Variable (EMSTOP).
6. Service test ending transition timer.
7. Unexplained internal software.

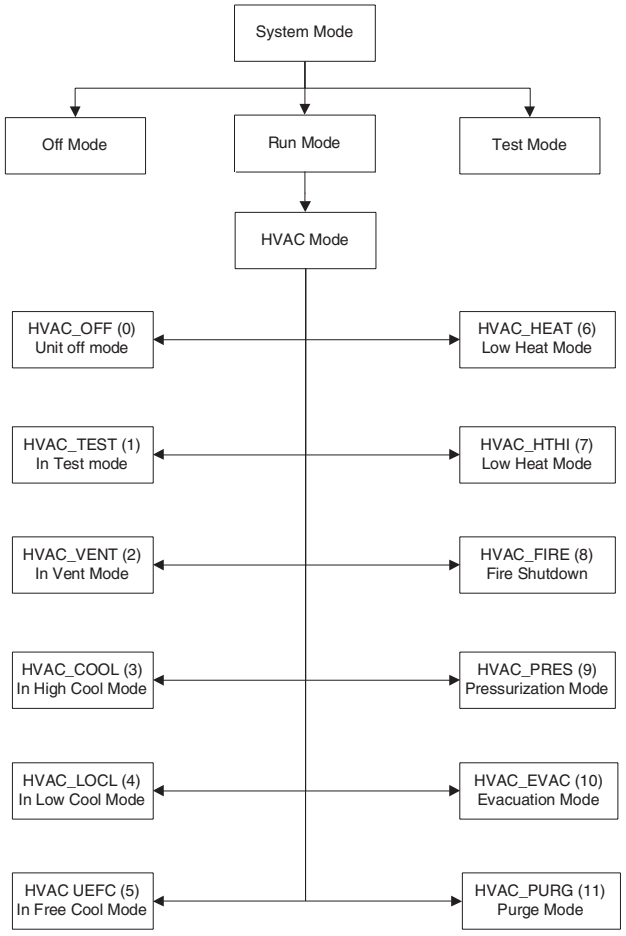


Fig. 21 — Operating Modes

SYSTEM MODE — TEST — When the system mode is Test, the software application in the control is constrained to the Test mode and is controllable via the local displays (Scrolling Marquee and Navigator) or through the factory service test control. See the Test Mode section for details on test control in this mode.

SYSTEM MODE — RUN — When the system mode is Run, the software application in the control is free to run the HVAC control routines by which cooling, heating, IAQ, etc., is possible.

HVAC MODE — The HVAC mode is reliant on the system mode to further qualify the operational control state. There are 12 HVAC modes.

The determination of the HVAC mode is based the operation conditions of the unit.

Mode 0 — HVAC_OFF — The unit is off as a result of a fire shutdown input or a remote Start Stop switch input. The status of the fire input can be check on the INPUT-SW.IN submenu through the Fire Shutdown Input (SW.IN).

If the Remote Switch configuration (RMT.C), which is found in the CONFIGURATION-OPTS submenu, is set to 2 (START STOP) then the remote switch (RE.MT) can be used to remotely start and stop the unit. This particular configuration forces the system down but honors compressor timeguards.

Mode 1 — HVAC_TEST — The unit is in the self test mode which is entered through the SERVICE TEST menu.

Mode 2 — HVAC_VENT — This is a normal operation mode where no heating or cooling is required and just outside air is being delivered to the space to control IAQ levels.

Mode 3 — HVAC_COOL — This is a normal cooling mode where a high cooling demand is being required.

Mode 4 — HVAC_LOCL — This is a normal cooling mode where low cooling demand is being required.

Mode 5 — HVAC_UEFC — In this mode the unit will be operating in cooling but will be using the economizer for free cooling. Entering this mode will depend on the status of the outside air. The unit can be configured for outside air change over, differential dry bulb changeover, outside air enthalpy changeover, differential enthalpy changeover, or a custom arrangement of enthalpy/dewpoint and dry bulb. See the Economizer section for further details.

Mode 6 — HVAC_HEAT — The unit will be in low heating demand mode using either gas heat or electric heat.

Mode 7 — HVAC_HTHI — The unit will be in the high heating demand mode using either gas heat or electric heat.

Mode 8 — HVAC_FIRE — The unit has been stopped due to a fire input (SW.IN) and then one of fire control modes, purge, evacuation, or pressurization has been evoked based on the remote switch inputs.

Mode 9 — HVAC_PRES — The unit is in the special fire pressurization mode where the supply fan is on, the economizer damper is open and the power exhaust fans are off. This mode is invoked by the Fire Pressurization (F.PRS) input which can be found in the INPUT-SW.IN submenu.

Mode 10 — HVAC_EVAC — The unit is in the special fire evacuation mode where the supply fan is off, the economizer damper is closed and the power exhaust fans are on. This mode is invoked by the Fire Evacuation (F.EVC) input which can be found in the INPUT-SW.IN submenu.

Mode 11 — HVAC_PURG — The unit is in the special fire purge mode where the supply fan is on, the economizer damper is open and the power exhaust fans are on. This mode is invoked by the Fire Evacuation (F.PRG) input which can be found in the INPUT-SW.IN submenu.

General Heating and Cooling Run Control — For normal comfort conditioning there are three basic modes.

These are:

- HEAT — Air is warmed by electric or gas heat. There are actually two modes under heat which are Low Heat (Mode 6 — HVAC_HEAT) and High Heat (Mode 7 — HVAC_HTHI).
- VENT — No cooling or heating is activated and just outside air is introduced into the conditioned space to control Indoor Air Quality. This is the vent mode (Mode 2 — HVAC_VENT).
- COOL — In this mode either free cooling and or mechanical cooling will be used to condition the space. There are also two versions of this mode which are High Cool (Mode 3 — HVAC_COOL) and Low Cool (Mode 4 — HVAC_LOCL). Also free cooling (Mode 5 — HVAC_UEFC) can be used in cooling.

Once the system is running and nothing is preventing the selection of one of the three run modes, a routine will be run to select the modes and control routines. There are three basic routines that will be called based on unit configuration data and the status of the input switches and temperatures. These three routines are HVACSTAT, HVACSPT2, and HVAC_VAV.

- HVACSTAT — This routine is used for heating and cooling with a conventional 2-stage thermostat and 2 stages heating and cooling. The routine can be used with units with more than two stages of mechanical cooling, but stages will be combined to yield only two stages. If multiple stages are desired, then HVACSPT2 should be used.
- HVACSPT2 — This routine is used for demand drive heating and cooling using high and low demand levels and will allow for more than 2 stages of cooling even if controlled with a 2-stage thermostat.
- HVAC_VAV — This routine is used for VAV system cooling and supply air temperature control.

The logic used to select which of these three routines should be used is shown in Fig. 22. Once the routine is selected then the appropriate economizer, compressor and heating staging routines will be used.

Selection of the three routines is dependent on the status of the inputs and the configuration of the unit.

The configuration variable that influences the selection of the routines is Unit Control Type (CTL.T) in the CONFIGURATION-UNIT submenu. This variable allows for the selection of the following options:

- SPT 2 STAGE — Two-stage control using a T55, T56, or T58 sensor. Calls the HVACSPT2 routine.
- SPT MULTI — Multiple stage control using a T55, T56, or T58 sensor. Calls the HVACSPT2 routine.
- TSTAT 2 STAGE — Two-stage control using a conventional thermostat. Calls the HVACSTAT routine.
- TSTAT MULTI — Multiple stage control using a 2-stage thermostat. Calls the HVACSTAT routine.
- VAV RAT — VAV operation with return air temperature heating and transition control. Calls the HVAC_VAV routine.
- VAV SPT — VAV operation with space temperature heating and transition control. Calls the HVAC_VAV routine.

HVACSTAT ROUTINE — This is a conventional heating and cooling routine where the Y1 and Y2 thermostat inputs are used to turn on stage 1 and stage 2 of cooling. It will be used when SPT 2 STAGE and TSTAT 2 STAGE are selected. If the economizer is usable then the control will use the HVACSPT2 routine and the high and low cooling demand and leaving air set points to position the economizer. If mechanical cooling is used, the control will sequence the compressors on based on the compressor loading sequence. See the section on compressor sequencing. For heating, the 2 stages of gas or electric heat are controlled by the W1 and W2 signals.

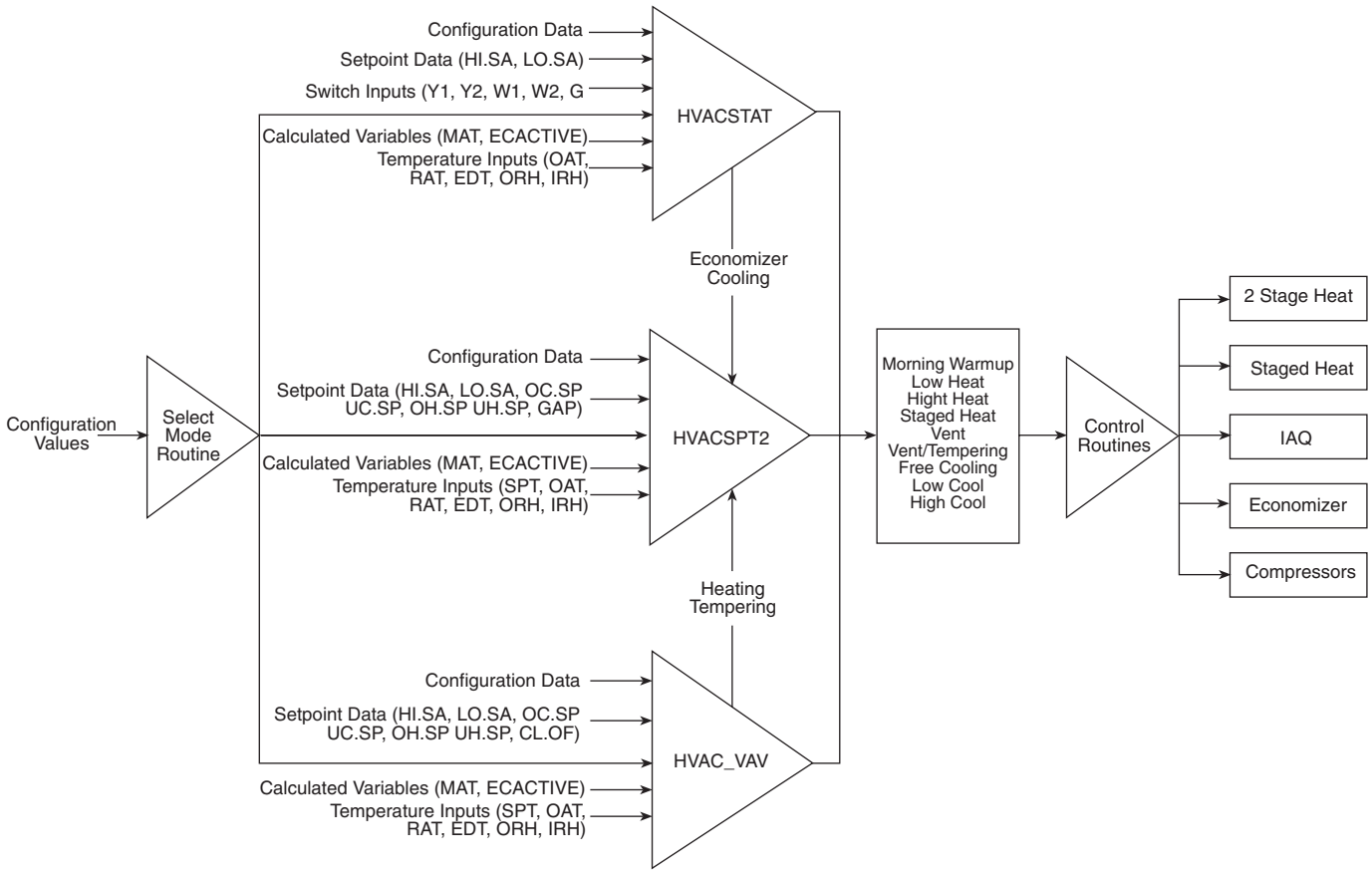


Fig. 22 — Routine Run Mode Selection Logic

The following inputs will be used by this routine:

Y1 — Thermostat Cooling Stage 1 input. Status can be checked in the INPUT-STAT submenu using the Y1 variable.

Y2 — Thermostat Cooling Stage 2 input. Status can be checked in the INPUT-STAT submenu using the Y2 variable.

W1 — Thermostat Heating Stage 1 input — Status can be check in the INPUT-STAT, submenu using the W1 variable.

W2 — Thermostat Heating Stage 2 input — Status can be checked in the INPUT-STAT submenu using the W2 variable.

HVACSPT2 ROUTINE — The HVACSPT2 routine is a demand driven routine. The routine compares space temperature to either the occupied cooling or heating set point if in occupied mode, or to either the unoccupied cooling or heating set point if in unoccupied mode to determine a demand level. The demand levels and timings will be used to determine low cool, high cool, low heat and high heat HVAC modes. The routine can use a proportional space sensor (T55, T56, or T58) or a return air temperature sensor. It can also be used with a conventional 2-stage thermostat with a Y1 and Y2 output. The Y1 will be used as a low cool demand the Y2 as a high cool demand. The routine will then provide multiple stage control for a 2-stage thermostat.

For the HVACSPT2 and HVAC_VAV routines, the following set points and inputs will be used:

- Space Sensor Temperature (SPT) — This is the temperature measured by the T55, T56, or T58 sensor. Status of the input can be found in the TEMPERATURE-UNIT submenu.
- Occupied Cool Set point (OCSP) — This is the desired space cooling temperature to be used in the Occupied Cooling mode. It can be configured using the SETPOINTS-COOL submenu.
- Occupied Heat Set point (OHSP) — This is the desired space temperature to be used during the Occupied Heating mode. It can be configured using the SETPOINTS-HEAT submenu.
- Unoccupied Cool Set point (UCSP) — This is the desired space cooling temperature to be used in the Unoccupied Cooling mode. It can be configured using the SETPOINTS-COOL submenu.
- Unoccupied Heat Set point (UHSP) — This is the desired space temperature to be used during the Unoccupied Heating mode. It can be configure using the SETPOINTS-HEAT submenu.
- Space Temperature Offset (SPTO) — This is used to configure the amount of offset that can be used to adjust the space temperature on a T56. The SPTO offset value can be read in the TEMPERATURE-UNIT submenu. To use this option, configure the Space Temp Offset (STO.S) variable in the CONFIGURATION-OPTS submenu and then set the range using the space temperature offset range (±) (STO.R), also located in the CONFIGURATION-OPTS submenu.
- Heat Cool Set Point Gap (GAP) — This the minimum difference that must be maintained between the heating and cooling set points as required by many building codes. (ASHRAE 90-1 requires a 5° F minimum deadband). It is configured in the SETPOINTS-GAP submenu.
- DMD Level Lo Cool On (LC.ON) — This is the low cooling differential demand enable set point temperature. It is the space temperature differential above the cooling set point which will enable low cooling demand. It is configured in CONFIGURATION-CMF.D submenu.
- DMD Level (–) Lo Cool Off (LC.OF) — This is the low cooling differential demand disable set point temperature. It is the space temperature differential above the cooling set point which will turn off low cooling demand. It is configured in CONFIGURATION-CMF.D submenu.
- DMD Level (+) Hi Cool On (HC.ON) — This is the incremental differential temperature at which high cooling will be enabled. It is configured in CONFIGURATION-CMF.D submenu.
- DMD Level Lo Heat On (LH.ON) — This is the low heating differential demand enable set point temperature. It is the space temperature differential below the heating set point which will enable low heating demand. It is configured in CONFIGURATION-CMF.D submenu.
- DMD Level (–) Low Heat Off (LH.OF) — This is the low heating differential demand disable set point temperature. It is the space temperature differential below the heating set point which will turn off low heating demand. It is configured in CONFIGURATION-CMF.D submenu.
- DMD Level (+) High Heat On (HH.ON) — This is the incremental differential temperature at which high heating will be enabled. It is configured in CONFIGURATION-CMF.D submenu.

The algorithm compares space temperature to either the occupied cooling or heating set point if occupied or to either the unoccupied cooling or heating set point if unoccupied to determine a demand level. The demand level and timing are used to determine the low cool, high cool, low heat, high heat demands. The high and low heating demands will then be used to determine the amount of heating (number of stages), free cooling (economizer position), and mechanical cooling (compressor stages).

For units with heating and cooling, there are three modes of temperature control: heating, ventilation, and cooling. The selected heating and cooling logic will determine the mode.

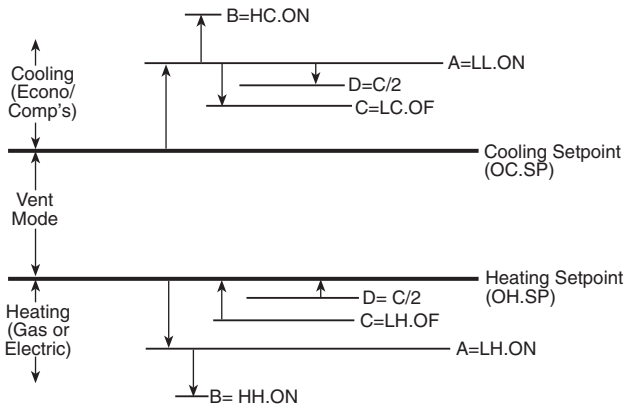
The control logic is shown in Fig. 23. The values are configurable and can be found in the CONFIGURATION Menu under CMF.D and in the SETPOINTS Menu under COOL and HEAT submenus.

The following are some examples of the logic with default values.

COOLING MODES EXAMPLE

LC.ON = 1.5 F
LC.OF = 0.5 F
HC.ON = 2.0
OCSP = 75 F

- Cooling Demand = Space Temp (SPT) – (set point).
- Low Cool begins when a 1.5 F demand exists (SPT = 76.5 [75.0 + 1.5]).
- Low Cool ends when the demand returns to 0.5 F (SPT = 76 F [76.5-0.5]).
- High Cool begins when the demand exceeds 2.0 F (SPT = 78.5 [76.5 + 2.0]).
- High Cool ends when the demand returns to LC.OF/2 below low demand on point (SPT = 76.25 [76.5-0.5/2]).



LEGEND

A — 1st Stage Relative To Set Point
B — 2nd Stage Relative To Set Point
C — 1st Stage Off Relative to A
D — 2nd Stage Off Relative to A (C/2)

Fig. 23 — Demand Drive Control Logic

High Cool cannot occur until there has been a minimum of 8 minutes of Low Cool operation. High Cool cannot occur as long as the Low Cool mode is causing a reduction in the space temperature trend. If the space temperature trend stops improving but the demand still exceeds 2.0 F, then High Cool mode goes into effect.

HEATING MODES EXAMPLE

LH.ON = 1.5 F

LH.OF = 0.5 F

HH.ON = 2.0

- Heating Demand = (set point) – Space Temp.
- Low Heat begins when a 1.5 F demand exists (SPT = 68.5 [70.0-1.5]).
- Low Heat ends when the demand returns to 0.5 F (SPT = 69 [68.5 +0.5]).
- High Heat begins when the demand exceeds 2.0 F (SPT = 66.5 [68.5-2.0]).
- High Heat ends when the demand returns to LH.OF/2 (SPT = 68.75 [68.5+0.5/2]).

High Heat cannot occur until there has been a minimum of 8 minutes of Low Heat operation. High Heat cannot occur as long as the Low Heat Mode is causing an increase in the space temperature trend. If the space temperature trend stops improving but the demand still exceeds 2.0 F, then High Heat goes into effect.

The routine can operate with either 2 stages or multiple stage of cooling based on the unit control type (CTL.T) located in the CONFIGURATION-UNIT submenu.

HVAC_VAV ROUTINE (VAVRAT AND VAVSPT) — This routine is used for the heating, cooling or ventilating control of VAV configured units. The heating, cooling, or ventilation mode will be controlled and configured using the cooling and heating set points. To configure when cooling is enabled or disabled, use the configurable VAV Cool On Set Point (V.C.ON) which can be configured in the SETPOINT-COOL submenu and the VAV Occupied Cool Off Delta (V.C.OFF) which can be configured in the SETPOINT-COOL submenu.

Both VAVRAT and VAVSPT routines start a mode and end a mode based on return-air temperature. The only difference is that when the unit is in unoccupied mode, the determination to bring on the supply fan and sample the return airstream before starting a mode will be based on space temperature or return air temperature.

When in occupied mode, the control will first determine if heating or cooling is to be used. If the return-air temperature (RAT) is above the VAV occupied cooling on set point (VC.ON), then the control will entering normal cooling mode and control to the leaving air temperature set point. The control will use the economizer if possible and then turn on compressors to meet the demand. Cooling will be turned off when the return air temperature goes below the VAV cool off delta set point (V.C.OFF).

If the return-air temperature falls below the Heating set point (OH.SP) then the control will use the logic from the HVACSPT2 Routine. When in heating, the HIR will be closed to indicate to the terminal controls that they must be open to the minimum unit CFM heating airflow. If the HIR is not installed, then the heating capacity could be limited by tripping of the heat limit switches.

When the unit is in the unoccupied mode, both cooling and heating modes (if enabled) will use the HVACSPT2 routine and the unoccupied set points.

The VAVRAT logic also has a special feature that is active during the unoccupied period. The logic will sample the return air temperature to determine whether or not a mode is necessary. An unnecessary mode can occur when the sensor(s) read the temperature with the supply fan off and the duct airflow stagnant. In addition, there is a configuration parameter (SAMP), which can reschedule a re-sampling of the airstream. This feature will result in the supply fan turning on during unoccupied periods.

The temperatures and configuration items that are used are listed below.

Temperatures

- Space Sensor Temperature (SPT) — This is the temperature measured by the T55 sensor. It is used in the unoccupied mode to initiate operation. This can be read in the TEMPERATURE-UNIT submenu.
- Evaporator Discharge Tmp (EDT) — This is the temperature of the air leaving the evaporator coil and is used for control of cooling and economizer control. This can be read in the TEMPERATURE-UNIT submenu.
- Return-Air Temperature (RAT) — This is the temperature of the return duct air temperature. This can be read in the TEMPERATURE-UNIT submenu.
- Mixed-Air Temperature (MAT) — This is the temperature of the air after the economizer and before the evaporator coil. This is a calculated value. The control routinely calibrates the economizer to develop an equation to calculate the MAT based on the OAT and RAT. This can be read in the TEMPERATURE-UNIT submenu.
- Outside-Air Temperature (OAT) — This is the temperature of the outside air temperature entering the economizer hood. This can be read in the TEMPERATURE-UNIT submenu.

Set Point

- Supply Air Set Point (SA.SP) — This is the supply air set point that is used during cooling with the economizer and compressor. It can be set using the SETPOINTS-SA.SP submenu.
- Supply Air Heating Set Point (SA.SH) — This is the supply air temperature set point used for staged gas heating.

Configurations

- Estimate MAT? — This is used to enable the mixed air estimation routine. It is located in the CONFIGURATION-UNIT submenu. If there is a need to reset the self learning table, use the Reset Mixed air temperature table (R.MAT) configuration.
- VAV Unocc. Fan Retry Time (SAMP) — This is used in the unoccupied mode to allow for sampling of the space temperature using the return air temperature.
- VAV Occupied Cool On Set Point (V.C.ON) — This is the temperature set point at which a VAV unit in the occupied mode will begin to attempt to maintain the Supply Air Set Point (SASP). It is configured in SETPOINTS-COOL submenu.
- VAV Occupied Cool Off Delta (V.C.OF) — This is the delta temperature below the VAV Occupied Cool On Set point (V.C.ON) at which a VAV unit in the occupied mode will stop attempting to maintain the Supply Air Set point (SASP). When the temperature is below this set point, the unit will be in the Vent mode. It is configured in SETPOINTS-COOL submenu.

VENTING MODE — For all units, the venting mode is used between heating and cooling modes, when outside air is used for ventilation and IAQ control. In this mode, cooling is not active and the damper will be at the minimum position. If equipped with an IAQ sensor, the damper will modulate closed as determined by the indoor IAQ CO_2 levels.

If the unit is operating in vent mode and the resulting supply-air temperature is too cold, then tempering of the supply air will be enabled. The air is heated with gas or electric heat to meet the Tempering Vent Set points (T.VO and T.VU). Tempering can also be used in cooling when the economizer is at the minimum effective damper position but the supply-air temperature is below the appropriate Tempering in Cool Set point. (T.CL).

The set points that are used for tempering are listed below.

- Tempering in Cool Supply Air Set Point (SASP) (T.CL) — This is used when the unit is in cooling mode and the economizer is at the minimum position. Tempering will add heat if the temperature is below the set point.
- Tempering Vent OCC SASP (T.VO) — This is the temperature set point that will be used for tempering during the Vent mode while in occupied mode.
- Tempering Vent Unocc SASP (T.VU) — This is the temperature set point that will be used for tempering during the Vent mode while in unoccupied mode.
- Tempering Purge SASP (T.PRG) — This is the temperature set point that is used when a pre-occupancy purge is running.

MECHANICAL COOLING CONTROL — When mechanical cooling is required by the run mode selection routine, the *Comfort*Link™ control has the capability to control the staging of the compressors in several different ways. Three scroll compressors are used on sizes 020 to 030 and four on sizes 035 to 060. In addition, the *Comfort*Link control supports the use of an optional Minimum Load Hot Gas Bypass Valve (MLV) that is directly controlled by the *Comfort*Link Control, and provides an additional stage of capacity as well as low load coil freeze protection. The control also integrates the use of an economizer with the use of mechanical cooling to allow for the greatest use of free cooling. When both mechanical cooling and the economizer are being used, the control will use the economizer to provide better temperature control and limit the cycling of the compressors.

The control also checks on various other operation parameters in the units to make sure that safeties are not exceeded and the compressors are reliably operated.

High Saturated Condensing Temperature Override — If, while compressors are running, the Saturated Condensing Temperature (SCT.A or SCT.B), is within 5 F of the maximum condensing temperature for 15 seconds or more, then the control will request a reduction in capacity will occur for the circuit. Additionally, the control will allow capacity to be added to the circuit for 10 minutes if needed.

Low Saturated Suction Temperature Override — If, while compressors are running, the Saturated Suction Temperature (SST.A or SST.B), is less than 28 F for two minutes or more, then the control will turn off a compressor on the circuit. Additionally, the control will not allow capacity to be added to that circuit for 10 minutes. If the unit is equipped with the optional minimum load valve in circuit A, then the control will use the MLV valve to prevent low saturated suction conditions in circuit A. If an economizer is being used it will also be closed to try to prevent a low SST condition.

Mechanical Cooling Allowed — If unoccupied free cooling is in effect or the active economizer is open less than 98%, then mechanical cooling is not allowed. If the economizer is open to 98% or more, then mechanical cooling will be allowed.

Low Ambient Compressor Lockout — If the Outside Air temperature (OAT) is below the Compressor Lockout temperature (CLO.A) then the compressors will not be allowed to run. The Compressor Lockout temperature can be set in the CONFIGURATION-COOL submenu.

React to Demand Limit — If the percentage of capacity currently running is greater than the allowed amount as determined by the demand limiting routine then the capacity will be limited or reduced.

Stage Control — The type of staging control will be determined based on the CTL.T configuration variable that can be found in the CONFIGURATION menu under the UNIT submenu. There are 6 options to select from but these will only use 2 basic sequencing routines.

- TSTAT 2STAGE — uses 2 stage control
- SPT 2STAGE — uses 2 stage control
- TSTAT MULTI — uses multi-stage control
- SPT MULTI — uses multi-stage control
- VAV RAT — uses multi-stage control
- VAV SPT — uses multi-stage control

TWO-STAGE CONTROL — When two-stage control is being used with a conventional thermostat, the compressor on-off operation will be mapped to the Y1, Y2 input signals from the thermostat. Staging of compressors will be as shown in Tables 23 and 24.

If a T55, T56, or T58 sensor is being used with 2-Stage Control, then the space temperature demand routine will be used to establish the low and high cooling demand. The demand will then be mapped to stage 1 and stage 2. See Tables 23 and 24. See the HVACSPT2 Routine for more information.

The logic will first check for the availability of the economizer. If free cooling can be used, then the control will first attempt to use the free cooling. When in free cooling mode, the HVACSPT2 demand driven routine will always be used. If no mechanical cooling is active, the economizer will first attempt to control to a cooling control point of either the supply air set point high (SA.HI) or supply air set point low (SA.LO) depending on whether high cool or low cool mode is in effect. The mode is determined by the status of the Y1 and Y2 inputs for thermostat equipped units or the HVACSPT routine for space sensor equipped units. If the set point cannot be satisfied, then cooling will be brought on one circuit at a time when the supply air temperature is greater the 1.5 F above the current cooling control point. A start-up time delay of 10 minutes and steady state delay after a compressor is energized of 5 minutes is enforced.

If one circuit of mechanical cooling is on, then the economizer will be attempt to control to 53 F. If low cool mode is in effect, the second circuit of mechanical cooling will be locked off. If both circuits of mechanical cooling are running, then the economizer will attempt to control to 48 F.

If the economizer is active and the outside air temperature (OAT) is less than the cooling control point + 0.5 F, the compressors will be locked off.

When mechanical cooling is on, the control will also use the economizer to trim the leaving-air temperature to prevent unnecessary cycles of the compressor stages.

MULTI-STAGE CONTROL — Multiple stage control types (CTL.T= SPT MULTI, TSTAT, MULTI, VAV RAT AND VAV SPT) will use Carrier's patented temperature control algorithm, based on leaving-air temperature with mixed air temperature compensation to determine when to stage up or down. See Tables 25-28.

The unit has an Outdoor Air Temperature sensor (OAT), Return Air Temperature sensor (RAT) and Evaporator Discharge Air Temperature sensor (EDT). These can be read using the TEMPERATURE-UNIT submenu. Because the control is sent the position of the economizer and the above three temperatures, the control can calibrate the economizer damper and the actual amount of outside air and return air at any given position. Over a few days of operation the control will develop a table of data that allows for calculation of the Mixed Air Temperature (MAT). This can be configured using the Estimate MAT? (MAT.S) setting. If there is a need to reset the table, the Reset MAT Table (R.MAT) command can be used. Both variables are located in the CONFIGURATION-UNIT submenu. This calculated MAT will then be used by the staging multi-stage routine to estimate the amount of temperature change when a stage is added or removed.

STAGING ALGORITHM — The control will use the Carrier Temperature Control Algorithm. The algorithm has self-adjusting gains that (aside from an overall system gain) eliminate the need for user gains for each of the proportional, integral and differential terms. The algorithm attempts to

balance tight control over the EDT, while concurrently minimizing compressor cycles. The basic control variable is called Load Factor (LOD.F). It is equal to SUM/Z, which is a ratio of the demand for cooling over an adjustable control limit. The LOD.F set point can be viewed in the RUN STATUS-VIEW submenu.

The logic also includes a series of override conditions that can cause mechanical staging to occur asynchronous to the SUM/Z ratio. The override conditions are an integral part of the algorithm. The PID algorithms are not generally well equipped to handle rarely occurring conditions but are able to tightly control the controlled point during normal operation. The overrides, in part, allow the control to intervene when the PID is not able to act quickly.

The overrides are:

- Pulldown Control — limits the addition of stages when the EDT is far from set point, but making steady progress towards set point
- Slow Change Override — keeps sum from integrating when the EDT is close to the set point and not changing rapidly
- Low Temperature Override — quickly removes stages when a substantial building load suddenly is removed (as when an auditorium vacates)
- High Temperature Override — quickly adds stages when a substantial building load is suddenly added (as when an auditorium fills up).
- Trim Control Override — eliminates a stage of mechanical cooling if the economizer can make up the cooling that is to be lost when the mechanical cooling is shut off.

Pull Down Control — If the error from set point is above 4° F, and the rate of change is less than –1° F per minute, then pull down is in effect, and sum is set to 0. This keeps mechanical cooling stages from being added when the error is very large, but there is no load in the space. Pull down for rooftop units is expected to rarely occur, but is included for the rare situation when it is needed. Most likely, pull down will occur when mechanical cooling first becomes available shortly after the control goes into an occupied mode (after a warm unoccupied mode).

Slow Change Override — With a rooftop unit, the design rise at 100% total unit capacity is generally around 30° F. For a unit with 4 stages, each stage represents about 7.5° F of change to EDT. If stages could reliably be cycled at very fast rates, the set point could be maintained very precisely. Since it is not desirable to cycle compressors more than 6 cycles per hour, slow change override takes care of keeping the PID under control when "relatively" close to set point.

Normally this control logic will not require any tuning or adjust other than to select the temperature control set points. If there is an application where the unit may be significantly oversized and there are indications of high compressor cycles then the Capacity Threshold Adjust (Z.GN) can be used to adjust the overall logic gain. Normally this is set to 1.0, but it can be adjusted from 0.5 to 4.0. As the number is increased the responsiveness of the logic will be slowed.

Table 23 — 2-Stage Sequence — 48/50AJ,AW020-027

STAGE	SEQUENCE 1			SEQUENCE 2		
	0	1	2	0	1	2
	Thermostat Inputs			Thermostat Inputs		
Y1	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
Y2	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
COMP	Compressor Status			Compressor Status		
A1	OFF	ON	ON	OFF	OFF	ON
A2	OFF	OFF	ON	OFF	ON	ON
B1	OFF	OFF	ON*	OFF	OFF	ON*
	Unit Capacity			Unit Capacity		
20	0%	33%	100%	0%	33%	100%
25	0%	30%	100%	0%	30%	100%
27	0%	33%	100%	0%	33%	100%

*Compressor start is delay 10 seconds from other compressor.

Table 24 — 2-Stage Sequence — 48/50AJ,AW030-060

STAGE	SEQUENCE 1			SEQUENCE 2		
	0	1	2	0	1	2
	Thermostat Inputs			Thermostat Inputs		
Y1	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
Y2	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
COMP	Compressor Status			Compressor Status		
A1	OFF	ON	ON	OFF	ON*	ON
A2	OFF	ON*	ON	OFF	ON	ON
B1	OFF	OFF	ON	OFF	OFF	ON*
B2	OFF	OFF	ON*	OFF	OFF	ON
	Unit Capacity			Unit Capacity		
30	0%	33%	100%	0%	49%	100%
35	0%	49%	100%	0%	48%	100%
40	0%	48%	100%	0%	43%	100%
50	0%	43%	100%	0%	45%	100%
60	0%	50%	100%	0%	50%	100%

*Compressor start is delay 10 seconds from other compressor.

Table 25 — Staging Sequence Without Hot Gas Bypass — 48/50AK,AY020-027 and Multi-Stage 48/50AJ,AW

STAGE	SEQUENCE 1					SEQUENCE 2				
	0	1	2	3	4	0	1	2	3	4
COMP	Compressor Status					Compressor Status				
A1	OFF	ON	ON	OFF	ON	OFF	OFF	ON	ON	ON
A2	OFF	OFF	ON	ON	ON	OFF	ON	ON	OFF	ON
B1	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	ON
	Unit Capacity 48/50A					Unit Capacity 48/50A				
20	0%	33%	67%	67%	100%	0%	33%	67%	67%	100%
25	0%	30%	65%	70%	100%	0%	35%	65%	65%	100%
27	0%	33%	67%	67%	100%	0%	33%	67%	67%	100%

Table 26 — Staging Sequence With Hot Gas Bypass — 48/50AK,AY020-027 and Multi-Stage 48/50AJ,AW

STAGE	SEQUENCE 1						SEQUENCE 2					
	0	1	2	3	4	5	0	1	2	3	4	5
COMP	Compressor Status						Compressor Status					
A1	OFF	ON*	ON	ON	OFF	ON	OFF	OFF	OFF	ON	ON	ON
A2	OFF	OFF	OFF	ON	ON	ON	OFF	ON*	ON	ON	OFF	ON
B1	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	ON	ON
	Unit Capacity 48/50A						Unit Capacity 48/50A					
20	0%	18%	33%	67%	67%	100%	0%	18%	33%	67%	67%	100%
25	0%	17%	30%	65%	70%	100%	0%	22%	35%	65%	65%	100%
27	0%	21%	33%	67%	67%	100%	0%	21%	33%	67%	67%	100%

*With MLV Valve ON.

Table 27 — Staging Sequence Without Hot Gas Bypass — 48/50AK,AY030-060 and Adaptive 48/50AJ,AW

STAGE	SEQUENCE 1						SEQUENCE 2					
	0	1	2	3	4	5	0	1	2	3	4	5
COMP	Compressor Status						Compressor Status					
A1	OFF	ON	ON	OFF	ON	ON	OFF	OFF	ON	ON	ON	ON
A2	OFF	OFF	ON	ON	ON	ON	OFF	ON	ON	OFF	ON	ON
B1	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
B2	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	ON	ON
	Unit Capacity 48/50A						Unit Capacity 48/50A					
30	0%	23%	45%	50%	73%	100%	0%	23%	45%	50%	73%	100%
35	0%	22%	48%	52%	74%	100%	0%	26%	48%	48%	74%	100%
40	0%	21%	43%	50%	71%	100%	0%	21%	42%	50%	72%	100%
50	0%	23%	45%	45%	68%	100%	0%	23%	45%	54%	77%	100%
60	0%	24%	50%	50%	74%	100%	0%	26%	50%	50%	76%	100%

Table 28 — Staging Sequence With Hot Gas Bypass — 48/50AK,AY030-060

STAGE	SEQUENCE 1							SEQUENCE 2						
	0	1	2	3	4	5	6	0	1	2	3	4	5	6
COMP	Compressor Status							Compressor Status						
A1	OFF	ON*	ON	ON	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON
A2	OFF	OFF	OFF	ON	ON	ON	ON	OFF	ON*	ON	ON	OFF	ON	ON
B1	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
B2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	ON	ON
	Unit Capacity 48/50A							Unit Capacity 48/50A						
30	0%	12%	23%	45%	50%	73%	100%	0%	12%	23%	45%	50%	73%	100%
35	0%	12%	22%	48%	52%	74%	100%	0%	16%	26%	48%	48%	74%	100%
40	0%	13%	21%	43%	50%	71%	100%	0%	13%	21%	42%	50%	72%	100%
50	0%	16%	23%	45%	45%	68%	100%	0%	16%	23%	45%	54%	77%	100%
60	0%	19%	24%	50%	50%	74%	100%	0%	21%	26%	50%	50%	76%	100%

*With MLV Valve ON.

Compressor Safeties — The 48/50A series units with the *Comfort*Link™ Controls include a compressor protection board (CSB) that protects the operation of the compressors.

The board senses the presence or absence of current to each compressor. If there is a command for a compressor to run and there is no current, then one of the following safeties or conditions have turned the compressor off.

- Compressor overcurrent — smaller compressors have internal line breaks and larger compressors have a dedicated circuit breaker for over current protection.
- Compressor short circuit — If the compressor circuit breaker that provides short circuit protection has tripped then there will be not current.
- Compressor motor over temperature — If the internal line-break or over temperature switch has opened.
- High-pressure switch trip

Alarms will also occur if the current sensor board malfunctions or is not properly connected to its assigned digital input.

If the compressor is commanded OFF and the Current Sensor reads ON, an alert is generated. This will indicate that a compressor contactor has failed closed. In this case a special mode "Compressor Stuck on Control" will be enabled and all other compressors will be turned off and an alarm enabled to indicate that service is required.

Any time the alert occurs, a strike is called out on the affected compressor. If three successive strikes occur the compressor will be locked out requiring a manual reset or power reset of the circuit board.

The clearing of strikes during compressor operation is a combination of 3 complete cycles or 15 continuous minutes of run time operation. If there are one or two strikes on the compressor and three short cycles (ON-OFF, ON-OFF, ON-OFF) less than 15 minutes each occur, the strikes are reset to zero for the affected compressor. If the compressor turns on and runs for 15 minutes straight with no compressor failure, the compressor strikes are cleared.

Time Delay Safety Limits — The control will not allow any output relay to come on within 3 seconds of any other output relay.

For outputs connected to the compressors, the control will use a Compressor Minimum OFF Time of 2 minutes, a Compressor Minimum ON Time of 3 minutes and a Minimum Delay before turning on second compressor of 10 seconds.

Heat stages require no time-guard protection but will be managed appropriately by the staging routines.

Demand Limiting — The term Demand Limit Control refers to the restriction of the machine capacity to control the amount of power that a machine will use. Demand limit control is intended to interface with an external Loadshed Device either through CCN communications, external switches, or 4 to 20 mA input.

The *Comfort*Link control has the capability of Load shedding and limiting in 3 different ways:

- Two discrete inputs tied to configurable demand limit set point percentages.
- An external 4 to 20 mA input that can reset capacity back linearly to a set point percentage.
- CCN loadshed POC (product outboard control) functionality.

To use Demand Limiting, select the type of demand limiting to use. Then configure the Demand Limit set points based on the type selected. The configurable set points can be found in the CONFIGURATION-DMD.L submenu. To disable Demand Limiting set the DMLS configuration to no demand limiting. To use Demand Limiting select the type of demand limiting to use. This is done using the Demand Limit Switch Select (DM.L.S) variable located in the CONFIGURATION-DMD.L submenu. The following options are available:

- (0) NO DEMAND LIMIT — This will disable the use of all demand limits.
- (1) SWITCH — This will enable the switch input demand limit using the switch inputs connected the CEM board. Connections should be made to TB6 terminals 4, 5, and 6.
- (2) 4-20MA — This will enable the use of a remote 4 to 20 mA demand limit signal. The CEM module must be used. The 4 to 20mA signal must come from an externally sourced controller and should be connected to TB6 terminals 9 and 10.
- (3) CCN LOADSHED — This will allow for loadsheding through CCN communications.

SWITCH DEMAND LIMIT — If the unit has been configured for Switch demand limiting by setting the DM.L.S variable to Switch, then the External Demand limit switch 1 (DLM.1) and External Demand Limit Switch 2 (DLM.2) will be used. The status of these switch inputs can be view using the INPUT-SW.IN submenu. The amount of demand limiting associated with each switch closure can be configured using the Demand Limit SW.1 Setpt (DLS.1) and Demand Limit SW.2 Setpt (DLS.2). These can be set using the CONFIGURATION-DMD.L submenu. Setting is the maximum % capacity that will be allowed when the switch is closed.

Closing the first stage demand limit contact will limit the mechanical cooling capacity of the unit to the first demand limit level (DLM.1). The unit will not exceed the percentage of capacity entered as the Demand Limit Switch 1 set point (DLM.1). Closing the contacts on the second demand limit switch (DLS.2) prevents the unit from exceeding the capacity entered as Demand Limit Switch 2 set point (DLM.2). The Demand Limit stage set to the lowest demand takes priority if both demand limit inputs are closed. If the demand limit percentage does not match unit staging, then the unit will limit capacity to the closest capacity stage.

To allow for interface with different control systems the switches can be configured as normally open or closed using the following configurations that are located in the CONFIGURATION-SW.LG submenu.

DMD.LMT.SW.1 Normally: (DM.1.L) — This sets the normally open and closed status of the switch.

DMD.LMT.SW.2 Normally (DM.2.L) — This sets the normally open and closed status of the switch.

EXTERNALLY POWERED 4 TO 20 MA DEMAND — To configure Demand Limit for 4 to 20 mA control, set the Demand Limit Select (DM.L.S) to 4 to 20 mA. Configure the Demand Limit at 20 mA (DL20) to the maximum loadshed value desired. The control will reduce allowable capacity to this level when the input signal (DM.AI) is at 20 mA. The DM.AI input can be found in the INPUT-MISC submenu. When the signal is 4 mA, 100% capacity will be allowed. For a signal between 4 mA and 20 mA, a linear limiting equation will be used.

CCN LOADSHED DEMAND LIMIT — To configure Demand Limit for CCN Loadshed control, set the Demand Limit Select (DM.L.S) to CCN loadshed. Configure the Loadshed Group Number (LSGN), Loadshed Demand Delta (LSDD), and Maximum Loadshed Time (LSTM). These set points are in the CONFIGURATION-DMD.L submenu.

The Loadshed Group number is established by the CCN system designer. The MBB will respond to a Redline command from the Loadshed control. When the Redline command is received, the current stage of capacity is set to the maximum stages available. Should the loadshed control send a Loadshed command, the MBB will reduce the current stages by the value entered for Loadshed Demand delta. The Maximum Loadshed Time defines the maximum length of time that a loadshed condition is allowed to exist. The control will disable the Redline/Loadshed command if no Cancel command has been received within the configured maximum loadshed time limit.

Head Pressure Control — The condenser head pressure control for the 48/50A series is controlled directly by the *Comfort*Link™ control. The SCT.A and SCT.B sensors, which are connected to the condenser coils in circuit A and B, will be used to measure the saturated condensing temperature. The actual values saturated condensing levels can be viewed using the TEMPERATURE-CIRC submenu. The equivalent refrigerant pressure can be viewed in PRESSURE-CIRC submenu using the SCP.A and SCP.B variables. These readings will be used to control the two condenser fan relays using the following logic. See Table 29.

If any compressor is on, then Condenser Fan A (OFC.A) will be energized. If the highest active circuit SCT is above 105 F then Condenser Fan B (OFC.B) will be turned on. If the highest SCT falls below 70 F then OFC.B fan should be turned off.

If the OAT is above 75 F, then both fan relays are turned on until the ambient temperature drops below 73 F or the compressors are turned off.

If either of the SCT sensors has failed, then the control defaults to control based on the OAT sensor and turns on OFC2 when the ambient is above 65 F and off when the ambient temperature is below 50 F.

If the SCT and OAT sensors have all failed then the control turns on OFC2 when compressors are on. If the unit is equipped with the accessory Motormaster® V control until then the Motormaster Installed (S.MM) should be enabled.

Table 29 — Condenser Fan Staging

FAN RELAY	4850A UNIT SIZE		
	020-035	040-050	060
OFC1 (RELAY 6)	OFM1	OFM1, OFM2	OFM1, OFM2
OFC2 (RELAY 5)	OFM2	OFM3, OFM4	OFM3, OFM4, OFM5, OFM6

Heating Control — The *Comfort*Link control controls the optional gas or electric heat. The type of heating is selected using the Heating Type (HT.TY) variable that can be found in the CONFIGURATION-HEAT menu. The following options are available:

0 = No Heat

1 = Electric Heat

2 = 2 Stage Gas Heat

3 = Staged Gas Heat

HEATING WITH LINKAGE — If the unit is going to be used with a CCN Linkage POC, then the EDT sensor will have to relocated from the factory-installed position (entering the fans) to the leaving ductwork position. This will allow the linkage to determine that the unit is in the heat mode and make the necessary terminal adjustments for CFM. This also requires that the SAT Sensor Sense Heat configuration (LAT.M) located in the CONFIGURATION-HEAT submenu be set to YES.

2-STAGE GAS AND ELECTRIC HEAT CONTROL — For constant volume applications, the control uses the thermostat demand to control the heat. If the unit is configured for use with a conventional 2-stage thermostat, then the W1 and W2 thermostat inputs are used to control the two stages of gas heat or electric heat. If the unit is configured for Space Temperature Control (SPT), then the low and high heat control logic will be used to determine the stage of capacity.

If the unit is configured for VAV operation with a return air sensor or VAV operation with a space temperature sensor, then the demand driven control logic with low and high demand will be used to control the two stages of heat. The need for heating will be determined by the HVAC heating and cooling Mode selection logic. Both VAV-RAT and VAV-SPT start and end a heat mode based on return air temperature. The only difference is during unoccupied mode, when the determination to bring on the supply fan is based on space temperature or return air temperature.

In addition to the normal demand driven logic there are also some overrides based on evaporator discharge temperature.

If HVACMODE = Low Heat

Request the supply fan

If EDT < 50 energize heat stages 1 and 2

Else energize heat stage 1

If HVACMODE = High Heat

Request the supply fan

Energize heat stage 1 and 2

IMPORTANT: When gas or electric heat is used with VAV applications, the HIR relay output must be connected to VAV terminal controls that will drive the terminals to an open position that provides airflow at or above the minimum CFM for the unit. Failure to do this will result in limit switch tripping.

MORNING WARMUP — Morning warmup is a subset of heating mode. Units that have been configured for no occupied heat (set the OCC.H variable to NO in the CONFIGURATION-HEAT submenu) will still go into heating when changing from unoccupied to occupied mode. If the return air temperature is below the occupied heating set point (OHSP), then heat will be turned on until the set point is exceeded. If the temperature drops below the OHSP, then it will be turned on again until a condition is reached where the RAT exceeds the VAV Occupied On Set Point (B.C.ON) and then it will be locked out until the next change from unoccupied to occupied mode.

Staged Gas Heat — As an option, the units with gas heat can be equipped with staged gas heat controls that will provide from 5 to 11 stages of heat capacity. This is intended for tempering air on CV units. Staged gas can be used on VAV units but the minimum CV heating airflow must be supplied. The HIR must be connected to the terminals controls to drive them to a minimum heating CFM.

Staged gas heat (if installed) will attempt to maintain the heating supply air set point (SA.SH) in low heat mode or tempering mode. If the unit is in a high heat HVAC mode, all stages of gas will be energized.

The Heat control loop is a PID design with exceptions, overrides and clamps. Capacity rises and falls based on set point and supply air temperature.

When the staged gas control is in Low Heat or Tempering Mode (HVACMODE), the algorithm calculates the desired heat capacity.

The basic factors that govern the controlling technique are:

- How fast the algorithm is run.
- The amount of proportional and derivative gain applied.
- The maximum allowed capacity change each time this algorithm is run.
- Deadband hold-off range when rate is low.

The staging of the gas heat will depend on the model size and amount of heat order. The pattern will be selected based on the Heat Stage Type (N.HST) which has the following options: 2 STAGE, 5 STAGE, 7 STAGE, 9 STAGE, 11 STAGE.

The Heat Stage Type can be configured using the CONFIGURATION-HEAT submenu. When using staged gas heat, the Heat Type (HT.TY) must be configured for Staged Heat. This is also located in the CONFIGURATION-HEAT submenu.

The values that should be used for N.HST are shown in Tables 30-34. They are not field-selectable values and must match the values in the tables.

The first two staged gas heat outputs are located on the MBB board and outputs 3, 4, 5, and 6 are located on the SCB board. These outputs are used to determine the number of stages (5 to 11) as shown in Tables 31-34.

IGC Control Logic — All gas heat units are equipped with the IGC board. This board provides control for the ignition system for the gas heat sections. On size 020-050 units there will be two IGC boards. On size 060 units there are three IGC boards.

When a call for gas heat is initiated, power is sent to W on the IGC boards. For standard 2-stage heat, all boards are wired in parallel. For staged gas heat, each board is controlled separately. When energized, an LED on the IGC board will be turned on. Each board will ensure that the rollout switch and limit switch are closed. The induced-draft motor is then energized. When the speed of the motor is proven with the Hall Effect Sensor on the motor, the ignition activation period begins.

The burners ignite within 5 seconds. If the burners do not light, there is a 22-second delay before another 5-second attempt is made. If the burners still do not light, this sequence is repeated for 15 minutes. After 15 minutes have elapsed and the burners have not ignited then heating is locked out. The control will reset when the request for W (heat) is temporarily removed.

When ignition occurs, the IGC board will continue to monitor the condition of the rollout switch, limit switches, Hall Effect Sensor, and the flame sensor. For 45 seconds after ignition has occurred, the IGC will request that the indoor fan be turned on. The IGC fan output is connected to indoor fan input on the MBB which will indicate to the controls that the indoor fan should be turned on (if not already on). If for some reason the overtemperature limit switch trips prior to the start of the indoor fan blower, on the next attempt the 45 second delay will be shortened by 5 seconds. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan delay will not change back to 45 seconds unless power is reset to the control.

The IGC boards only control the first stage of gas heat on each gas valve. The second stages are controlled directly from the MBB board.

The IGC board has a minimum on-time of 1 minute. In Modes such as Service Test where long minimum on times are not enforced, the one-minute timer on the IGC will still be followed and the gas will remain on for a minimum of one minute.

Table 30 — Staged Gas Heat

UNIT SIZE	HEAT CAPACITY	UNIT MODEL NO. POSITION NO. 5	N.HTR ENTRY VALUE	N.HST ENTRY VALUE
020-035	Low	S	1	1 = 5 STAGE
	High	T	2	2 = 7 STAGE
040-050	Low	S	1	1 = 5 STAGE
	High	T	1	1 = 5 STAGE
060	Low	S	4	4 = 11 STAGE
	High	T	3	3 = 9 STAGE

Table 31 — Staged Gas Heat Control Steps (N.HST = 1)

STAGE	RELAY OUTPUT						CAPACITY %
	Heat 1	Heat 2	Heat 3	Heat 4	Heat 5	Heat 6	
	MBB-RLY8	MBB-RLY7	SCB-RLY1	SCB-RLY2	SCB-RLY3	SCB-RLY4	
	IGC1	MGV1	IGC2	MGV2	IGC3	MGV3	
0	OFF	OFF	OFF	OFF	OFF	OFF	0
1	ON	OFF	OFF	OFF	OFF	OFF	37
2	ON	ON	OFF	OFF	OFF	OFF	50
3	ON	OFF	ON	OFF	OFF	OFF	75
4	ON	ON	ON	OFF	OFF	OFF	87
5	ON	ON	ON	ON	OFF	OFF	100

Table 32 — Staged Gas Heat Control Steps (N.HST = 2)

STAGE	RELAY OUTPUT						CAPACITY %
	Heat 1	Heat 2	Heat 3	Heat 4	Heat 5	Heat 6	
	MBB-RLY8	MBB-RLY7	SCB-RLY1	SCB-RLY2	SCB-RLY3	SCB-RLY4	
	IGC1	MGV1	IGC2	MGV2	IGC3	MGV3	
0	OFF	OFF	OFF	OFF	OFF	OFF	0
1	ON	OFF	OFF	OFF	OFF	OFF	25
2	ON	ON	OFF	OFF	OFF	OFF	33
3	OFF	OFF	ON	OFF	OFF	OFF	50
4	OFF	OFF	ON	ON	OFF	OFF	67
5	ON	OFF	ON	OFF	OFF	OFF	75
6	ON	ON	ON	OFF	OFF	OFF	83
7	ON	ON	ON	ON	OFF	OFF	100

Table 33 — Staged Gas Heat Control Steps (N.HST = 3)

STAGE	RELAY OUTPUT						CAPACITY %
	Heat 1	Heat 2	Heat 3	Heat 4	Heat 5	Heat 6	
	MBB-RLY8	MBB-RLY7	SCB-RLY1	SCB-RLY2	SCB-RLY3	SCB-RLY4	
	IGC1	MGV1	IGC2	MGV2	IGC3	MGV3	
0	OFF	OFF	OFF	OFF	OFF	OFF	0
1	ON	OFF	OFF	OFF	OFF	OFF	25
2	ON	ON	OFF	OFF	OFF	OFF	33
3	ON	OFF	ON	OFF	OFF	OFF	50
4	ON	ON	ON	OFF	OFF	OFF	58
5	ON	ON	ON	ON	OFF	OFF	67
6	ON	OFF	ON	OFF	ON	OFF	75
7	ON	OFF	ON	ON	ON	OFF	83
8	ON	ON	ON	ON	ON	OFF	92
9	ON	ON	ON	ON	ON	OFF	100

Table 34 — Staged Gas Heat Control Steps (N.HST = 4)

STAGE	RELAY OUTPUT						CAPACITY %
	Heat 1	Heat 2	Heat 3	Heat 4	Heat 5	Heat 6	
	MBB-RLY8	MBB-RLY7	SCB-RLY1	SCB-RLY2	SCB-RLY3	SCB-RLY4	
	IGC1	MGV1	IGC2	MGV2	IGC3	MGV3	
0	OFF	OFF	OFF	OFF	OFF	OFF	0
1	ON	OFF	OFF	OFF	OFF	OFF	19
2	ON	ON	OFF	OFF	OFF	OFF	25
3	ON	OFF	OFF	OFF	ON	OFF	38
4	ON	ON	OFF	OFF	ON	OFF	44
5	ON	ON	OFF	OFF	ON	ON	50
6	ON	OFF	ON	OFF	OFF	OFF	56
7	ON	ON	ON	OFF	OFF	OFF	63
8	ON	OFF	ON	OFF	ON	OFF	75
9	ON	OFF	ON	ON	ON	OFF	88
10	ON	ON	ON	ON	ON	OFF	94
11	ON	ON	ON	ON	ON	ON	100

An LED indicator is provided on the IGC to monitor operation. The IGC boards are located in the gas heat section below the indoor fans. During normal operation the LED is continuously on. Table 35 shows the error codes.

Table 35 — IGC LED Indicators

ERROR CODE	LED INDICATION
Normal Operation	On
Hardware Failure	Off
Fan On/Off Delay Modified	1 Flash
Limit Switch Fault	2 Flashes
Fame Sense Fault	3 Flashes
Five Consecutive Limit Switch Faults	4 Flashes
Ignition Lockout Fault	5 Flashes
Ignition Switch Fault	6 Flashes
Rollout Switch Fault	7 Flashes
Internal Control Fault	8 Flashes
Software Lockout	9 Flashes

NOTES:
1. There is a 3 second pause between error code displays.
2. If more than one error code exists, all applicable error codes will be displayed in numerical sequence.
3. Error codes on the IGC will be lost if power to the unit is interrupted.

Economizer — The *Comfort*Link™ controls determine the economizer position. The economizer is used to provide ventilation air and also provide free cooling based on a configurable changeover command.

The economizer damper position is controlled by a digitally controlled actuator motor that is connected directly the dampers. The logic that is used to control the motor is based on the evaporator discharge temperature sensor (EDT). The demand temperature control logic uses the high and low cool demands for the economizer control. The set points can be configured in the SETPOINTS-HI.SA and SETPOINTS-LO.SA submenus using the Supply air Set Point HI (HI.SA) and Supply Air Set Point LO (LO.SA) configurations. The HVAC mode routine HVAVSPT2 logic will determine when the high or low set point will be used.

The following settings in the CONFIGURATION-ECON menu can be used to configure the operation of the economizer.

EC.EQ — ECONOMIZER INSTALLED — This is a Yes/No configuration and indicates that there is an economizer installed.

E.CGO — ECON CHANGEOVER SELECT — This is used to select the type of changeover control. The types are Outdoor dry bulb changeover control, Differential dry bulb changeover control, Outdoor Enthalpy changeover control, Differential Enthalpy control, and Custom Curve.

All units are equipped with an outside and return air dry bulb temperature sensor so the unit can be configured for either dry bulb or differential dry bulb control.

OUTDOOR DRY BULB CHANGEOVER CONTROL — This is used when the use of the economizer will be determined based on outside air temperature. Typically this is used in dry climates where outdoor humidity is relatively low. All units are shipped as standard with an outdoor air temperature (OAT) which is located inside the economizer hood. The set point for the outdoor air upper limit can be configured in the CONFIGURATION-ECON submenu using the High OAT Lockout Temp (OAT.L) setting.

DIFFERENTIAL DRY BULB CHANGEOVER CONTROL — This is used to compare the outdoor temperature with the return duct temperature which then allows the airstream with the lowest temperature to be used. All units are shipped with an outside air (OAT) and return air temperature sensor (RAT). The factory default configuration is differential dry bulb changeover control. No configuration is required other than to enable the feature using the Econ Changeover Select (E.CGO) setting.

OUTDOOR ENTHALPY CHANGEOVER CONTROL — This option uses the outdoor enthalpy A, B, C, or D curve to determine the changeover. See Fig. 24 for the curves. This option should be used in climates with higher humidity conditions. Unlike most control systems that use an enthalpy switch or enthalpy sensor, the A series units use the outdoor dry bulb sensor and an accessory relative humidity sensor (OA.RH) to calculate the enthalpy of the air. In addition the software has the standard A, B, C, and D curves built into the control for use in changeover control. The High OAT lockout temperature can still be used in combination with the enthalpy curves.

DIFFERENTIAL ENTHALPY CONTROL — This option compares the outdoor air enthalpy with the return air enthalpy and uses the airstream with the lowest enthalpy. This option should be used in climates with high humidity conditions. This option also uses humidity sensors and dry bulb sensors to calculate the enthalpy of the outdoor and return air. An accessory outdoor air humidity sensor (OA.RH) and return air humidity sensor (RA.RH) are used for this. The High OAT lockout temperature can still be used in combination with the differential changeover control.

CUSTOM CURVE — This is a new feature in the industry. The custom curve feature allows for a combination of an enthalpy/dewpoint curve and a dry bulb curve. As shown in Fig. 25, the user can set a maximum outdoor air enthalpy curve as one limit and then set a dry bulb curve as another limit to create a custom curve. As enthalpy and dewpoint saturation curves are essentially parallel, Table 36 can be used to convert dewpoint to enthalpy.

Table 36 — Dewpoint-Enthalpy Conversion

DEWPOINT (F)	ENTHALPY (BTU/LB)
50	20.29
51	20.85
52	21.43
53	22.01
54	22.61
55	23.22
56	23.84
57	24.47
58	25.12
59	25.78
60	26.45
61	27.14
62	27.85

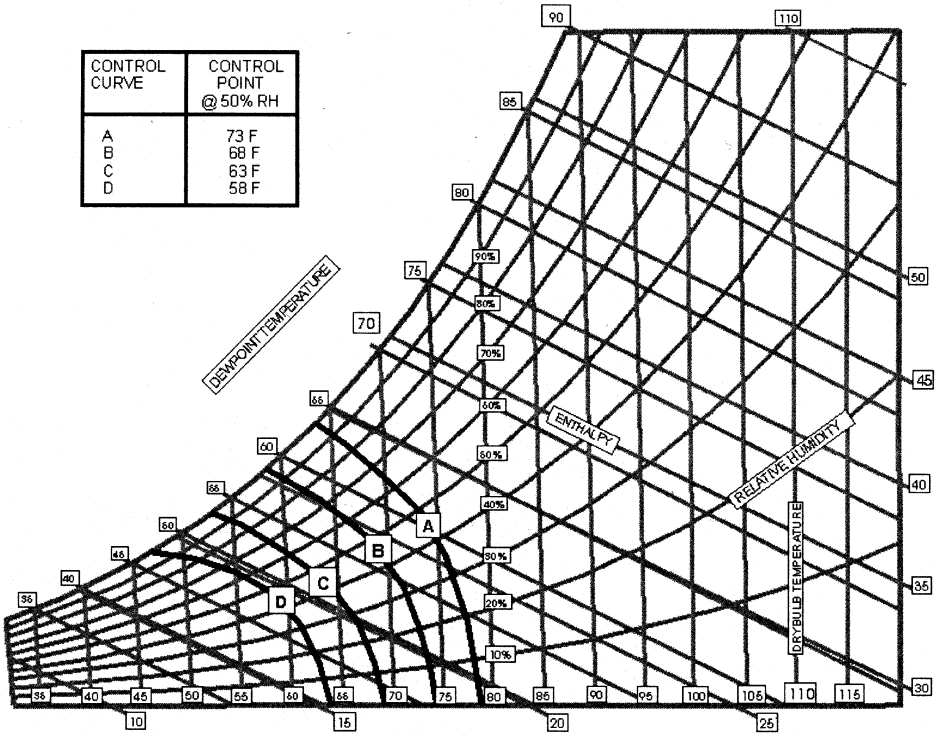


Fig. 24 — Enthalpy Changeover Curves

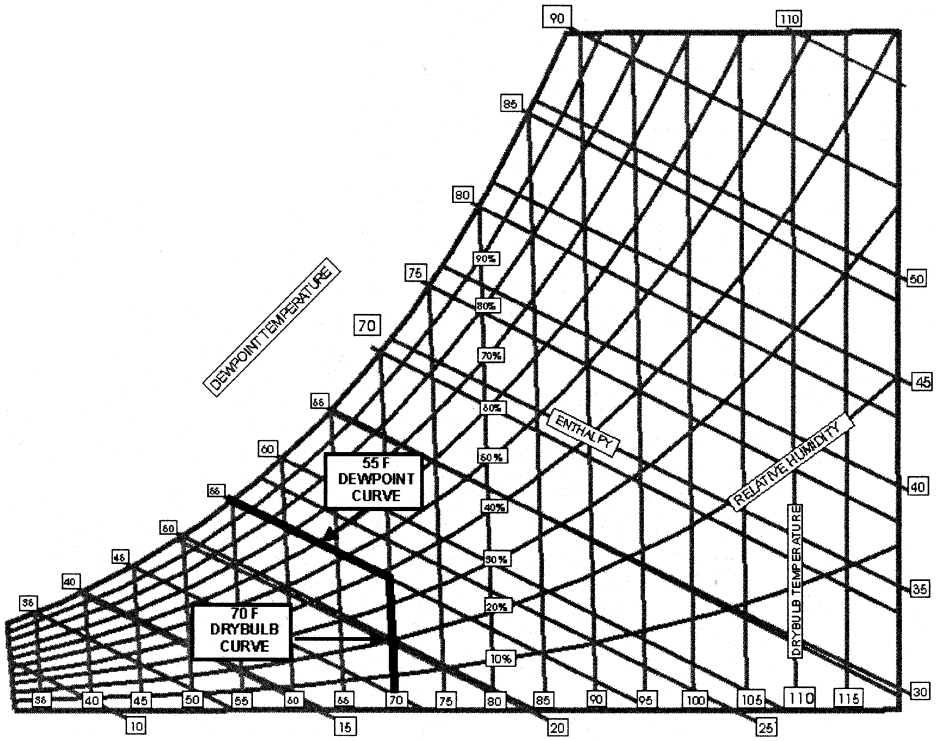


Fig. 25 — Custom Changeover Curve Example

ECONOMIZER CONTROL TYPE (E.CTL) — The options of DIG/POSITION, DIG/COMMAND, and ANALOG CTRL are available. The control should be configured for DIG/COMMAND.

ECONOMIZER MIN POSITION (MIN.P) — This is the minimum position that is used for ventilation requirements during the occupancy periods. If the unit is equipped with an IAQ sensor, then the dampers may be modulated below this position if the IAQ CO_2 levels are low. The MIN.P position will then be used for the maximum IAQ ventilation position.

HIGH OAT LOCKOUT TEMP (OAT.L) — This is a configurable temperature above which the economizer will be locked out.

A, B, C, D CURVE SELECT (OA.EC) — These are the selectable curves as shown in Fig. 24.

OUTDOOR AIR DEWPOINT TEMP LIMIT (OA.DL) — This is a configurable maximum dewpoint temperature above which the economizer will be disabled. It can be used with any of the changeover controls.

OUTDOOR ENTH COMPARE VALVE (OEN.C) — This is a CCN broadcast enthalpy valve that can be used for enthalpy changeover control.

UNOCC FREE COOL CONFIG (UFC.C) — This is used to configure the unoccupied free cooling economizer control. If set to 1, then free cooling will be available during the unoccupied period. If set to 2, then free cooling will start UFC.T minutes before the occupied period.

UNOCC FREE COOL TIME (UFC.T) — This is the configurable time, which will be used for unoccupied free cooling prior to start-up.

ENABLE ECONOMIZER TRIM (TRM.E) — This will be used to enable the economizer trim routine to close the dampers during periods which both the economizer mode and compressors are being used. The purpose is to limit compressor cycles and to provide better temperature control.

ECONOMIZER TEMP DEADBAND (EC.CB) — This is an adjustable temperature deadband within which the economizer will not be adjusted to maintain the leaving-air temperature.

REMOTE ECONOMIZER SWITCH (E.ENA) — In addition to the normal economizer control, the *Comfort*Link™ also supports the use of a remote economizer enable control where the economizer will be enabled and disabled from a remote switch input. The same switch can also be configured to control a 2-position economizer. The switch is connected to TB6, terminals 1 and 2. The use of the switch must be configured using the Economizer Switch Configuration (ECO.S), which is located in the CONFIGURATION-OPTS submenu. The ECO.S can be configured for the following: 0=NONE, 1=ECON ENABLE, 2=POSITION OVERRIDE.

When configured for Econ Enable, the closure of the switch will indicate that the economizer can be used for free cooling. The control will then use the economizer control routine which controls to the high or low demand supply air set point.

When the switch is configured for Position Override it will act as a 2-position damper. When the switch is closed and the unit is in the occupied mode, the position will be set to the economizer min position (MIN.P). When the switch is closed, the dampers will open to the full open position.

RETURN AIR RH SENSOR (R.RH.S) — This is located in the CONFIGURATION-OPTS submenu and is used to enable and disable the use of the return air humidity sensor.

OUTSIDE AIR RH SENSOR (O.RH.S) — This is located in the CONFIGURATION-OPTS submenu and is used to enable and disable the use of the outside air humidity sensor.

ECONOMIZER SWITCH NORMALLY (EC.SL) — This is located in the CONFIGURATION-SW.LG submenu and is used to configure the normally open and closed status of the switch.

UNOCCUPIED ECONOMIZER FREE COOLING — Unoccupied Economizer Free Cooling is used to start the indoor fan/supply fan when the outside temperature is low to pre-cool the space with outside air. This is done to delay the need for mechanical cooling when the system enters the occupied period. Once the space has been sufficiently cooled during this cycle, the fan will be stopped.

To use this option the user must configure the Unocc Free Cooling Configuration Variable (UFC.C) which can be found in the CONFIGURATION-ECON submenu. The following are the options: 0 = disabled, 1= all the time, 2= x time before occupied.

If set to 1, then free cooling will be used anytime during the unoccupied period.

If set to 2, then free cooling will be started for a configurable time before the next occupied period. The configuration variable is Unocc. Free Cooling time (UFC.T) and is located in the CONFIGURATION-ECON submenu.

There are some qualifications that must occur for the unoccupied free cooling to be used.

- The UFC.C (unoccupied economizer free cooling option) must be set to 1 or 2.
- Unit is in the unoccupied state.
- Temperature Compensated Start Mode is not active.
- Unit configured for economizer.
- Not in a cooling mode (HVACMODE not in cooling).
- Not in a heating mode (HVACMODE not in heating).
- Space temp reading available, which means the control must be using an SPT sensor and can not be using an electro-mechanical 2 stage thermostat.
- Outside air temperature reading is available (OAT sensor status good).
- Economizer active except for the fact that the fan has not been on for 30 seconds (internal timing).
- OAT > NTLO (nighttime lockout temperature) with 1° F.

If all of the above conditions are met, unoccupied free cooling routine is allowed to be used.

The Night Time Free Cooling Set point (NT.SP) is calculated as follows:

NTSP = OCSP

The Night Free Cooling Mode shall be started when:

SPT > (NTSP + 2) and SPT > (OAT + 8)

The Night Time Free Cooling Mode shall be stopped when:

SPT < NTSP or SPT < (OAT + 3)

When the Unoccupied Economizer Free Cooling mode is active, the supply air fan is turned on and economizer damper is modulated to control to the set point.

IAQ Control — The *Comfort*Link™ control has the capability of demand ventilation control using an IAQ sensor. The indoor air quality (IAQ) is measured using a CO_2 sensor whose measurements are displayed in parts per million (PPM). The IAQ sensor can be field-installed or factory-installed in the return duct. If IAQ must be measured directly in the space instead of the unit return duct, a wall-mounted accessory can be field installed. The sensor must be 4 to 20 mA and must be include a 24-V supply. Remote sensors should be powered from an external 24-V supply. The sensor connects to TB5 terminal 6 and 7. Be sure to leave the 182-ohm resistor in place on terminals 6 and 7.

The unit's indoor air quality algorithm modulates the position of the economizer damper between two user configurations depending upon the relationship between the IAQ and the Outdoor Air Quality (OAQ). The lower of these two positions is referred to as the Minimum IAQ Damper Position (AQ.MP) while the higher is referred as Economizer Minimum Position (MIN.P). The AQ.MP should be set to an economizer position that brings in enough fresh air to remove contaminants and CO_2 generated by sources other than people. The MIN.P should be set to an economizer position that brings in enough fresh air to remove contaminants and CO_2 generated by all sources including people. The MIN.P value is the design value for maximum occupancy.

The logic that is used to control the dampers in response to IAQ conditions is shown in Fig. 26. Refer to this figure to help understand how the logic works. The *Comfort*Link control will begin to open the damper from the AQ.MP position when the IAQ level begins to exceed the OAQ level by a configurable amount, which is referred to as AQ Differential Low (AQD.L). If OAQ is not being measured, OAQ can be manually configured. It should be set at around 400 to 450 ppm or measured with a handheld sensor during the commissioning of the unit. The OAQ reference level can be set using the OAQ Set Point (OA.SP) which is located in the CONFIGURATION-IAQ submenu. When the differential between IAQ and OAQ reaches the configurable Diff. Air Quality Hi Limit (AQD.H), then the economizer position will be MIN.P. When the IAQ-OAQ differential is between AQD.L and AQD.H, the control will modulate the damper between AQ.MP and MIN.P as shown in Fig. 26. The relationship is a linear relationship but other non-linear options can be used. The damper position will never exceed the bounds specified by AQ.MP and MIN.P during IAQ control. If the building is occupied and the indoor fan is running and the differential between IAQ and OAQ is less than AQD.L, the economizer will remain at AQ.MP. The economizer will not close completely. The damper position will be 0 when the fan is not running or the building is unoccupied. The damper position may exceed MIN.P in order to provide free cooling.

The *Comfort*Link control is configured for air quality sensors which provide 4 mA at 0 PPM and 20 mA at 2000 PPM. If a sensor has a different range, these bounds must be reconfigured. The values for I.4M, I.20M, O.4M, O.20M are located in the CONFIGURATION-IAQ submenu. The bounds represent the PPM corresponding to 4 mA and 20 mA for IAQ and OAQ, respectively.

If OAQ exceeds the OAQ Lockout Value (OAQ.L), then the economizer will remain at AQ.MP. The OAQ.L value can be configured in the CONFIGURATIONS-IAQ submenu. This is used to limit the use of outside air which outdoor air CO_2 levels are above the OAQ.L limit.

Normally a linear control of the damper vs. the IAQ control signal can be used, but the control also supports non-linear control. Different curves can be used based on the Diff.IAQ Responsiveness Variable (I.CRV) which is located on the CONFIGURATION-IAQ submenu. See Fig. 27.

The control also supports the use of external IAQ control signals, which can be connected to TB5 terminals 6 and 7. This will work like the IAQ sensor, except the 4 to 20 mA signal will come from an external energy management system. At 4 mA the position of the economizer will be at the AQ.MP position and at 20 mA the position will be at the MIN.P position. The user will have to configure the IAQ MinPos Sensor Config (IA.CF) to CNTL MIN POS which is located in the CONFIGURATION-IAQ submenu.

The control also supports the use of an IAQ override switch, which is connected to TB6 terminals 13 and 14. This option will allow the use of an external IAQ signal to move the economizer between the AQ.MIN position and a configurable maximum position called IAQ Econo Override Pos (OVR.P) The user will have to configure the IAQ MinPos Sensor Config (IA.CF) to OVERRIDE, which is located in the CONFIGURATION-IAQ submenu.

The IAQ routine can also be configured to work with the CCN DCV POC which requires that the IAQ MinPos Sensor Config (IA.CF) be set to DCV.

The IAQ routine can also be configured to override the indoor fan and turn it on. This is configured through the IAQ 4 to 20 mA fan config (IA.FN), which is located in the CONFIGURATION-IAQ submenu.

There are a large number of configurations that can be used with the IAQ routine. Most have been covered in the above paragraphs, but the following will provide some additional details and explanations.

IAQ MIN POS SENSOR CONFIG (IA.CF) — This is used to configure the type of IAQ position control. It has the following options:

- MIN POS POT — Used with a remote potentiometer that is used for control of the minimum position (IQMIN). The potentiometer must be a 10K potentiometer and will be connected TB5 terminals 6 and 7.
- CNTL MIN POS — This is used when a remote 4 to 20 mA signal will be used for the IAQ input.
- OVERRIDE IAQ — This will be used with an IAQ override switch is used.
- DCV — This will be used with DCV control.
- NO IAQ — This configuration will indicate that no remote IAQ minimum setting will be used and the internal software setting will be used.

IAQ 4 TO 20 MA FAN CONFIG (IA.FN) — This configuration is used to configure the control of the indoor fan. If this option is used then the IAQ sensor must be in the space and not in the return duct. It has the following configurations:

- NEVER — IAQ demand will never override the fan and turn it on.
- OCCUPIED — IAQ demand will override the fan in occupied mode only.
- OVERRIDE IAQ — IAQ will always override the status of the indoor fan.

IAQ DISCRETE INPUT CONFIG (IAIC) — This configuration is used to set the type of IAQ sensor. The following are the options:

- NO IAQ — This is used to indicate that no discrete input will be used and the standard IAQ sensor input will be used.
- DCV — This will indicate that the IAQ level will be communicated through CCN.
- OVERRIDE IAQ — This will indicate that an IAQ override switch will be used.

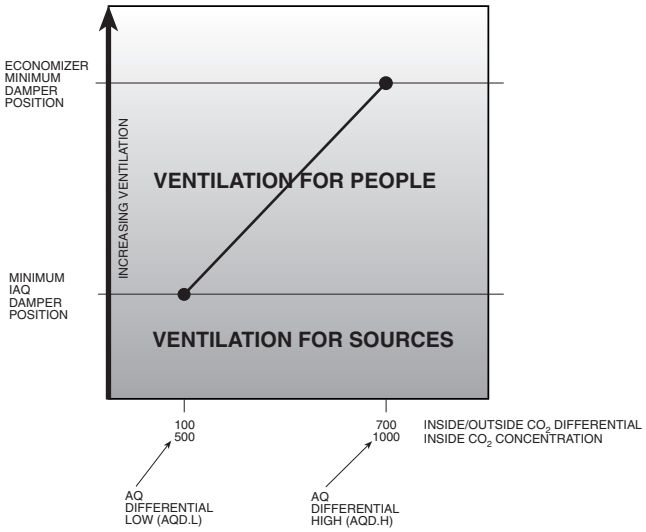
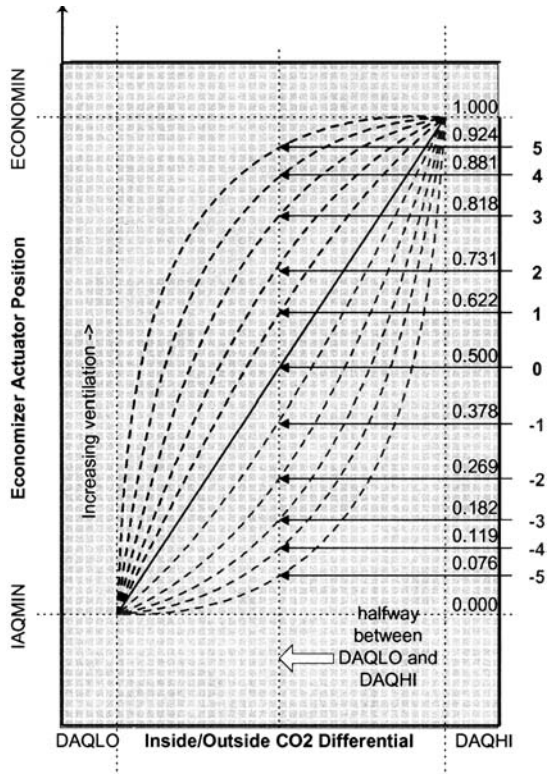


Fig. 26 — IAQ Control



NOTE: Calculating the IAQMIN and ECONOMIN damper position based on differential IAQ measurement.

Based on the config parameter IAQREACT, the reaction to damper positioning based on differential air quality ppm can be adjusted.

IAQREACT = 1 to 5 (more responsive)
IAQREACT = 0 (linear)
IAQREACT = –1 to –5 (less responsive)

Fig. 27 — IAQ Response Curve

IAQ DISC.IN FAN CONFIG (IA.IF) — This is used to configure the operation of the fan during an IAQ demand condition. It has the following configurations:

- NEVER — The routine will not control the indoor fan and the fan must be turned on by other routines.
- OCCUPIED – Fan will be turned on during the occupied period, but not in the unoccupied period.
- ALWAYS – IAQ will always turn the fan on when an IAQ condition exists.

IAQ DEMAND VENT MIN POS. (AQ.MP) — This configuration will be used to set the minimum damper position in the occupied period when there is no IAQ demand.

ECONOMIZER MIN POSITION (MIN.P) — This is the fully occupied minimum economizer position. It is configured in the CONFIGURATION-ECON submenu.

IAQ PURGE (PRG.E) — This is used to enable IAQ pre-occupancy purge.

IAQ PURGE DURATION (PRG.D) — This is the configurable time that will be used to turn on purge prior to occupancy.

IAQ PURGE LO TEMP MIN POS (PG.LT) — This is used to configure a low limit for damper position to be used during the purge mode.

IAQ PURGE HI TEMP MIN POS (PG.HT) — This is used to configure a maximum position for the dampers to be used during the purge cycle.

IAQ ECONO OVERRIDE POS (OVR.P) — This configuration is the position that the economizer goes to when the override switch is closed.

OAQ 4-20MA SENSOR CONFIG (OA.CF) — This is used to configure the type of outdoor sensor that will be used for OAQ levels. It has the following configuration options:

- NO OAQ — No sensor will be used and the internal software reference setting will be used or a configured set point using the OAQ Set Point (OA.SP) which is located in the CONFIGURATION-IAQ submenu.
- DCV OAQ — When this configuration is selected the Demand Control Ventilation routine will use the OAQ sensor as the reference level to compare the IAQ measured value.
- LOCKOUT — If this configuration is selected then the OAQ sensor will be used for lockout of demand ventilation but will not be used for the OAQ reference level. This is a 4 to 20 mA input.

OAQ LOCKOUT VALUE (OAQ.L) — This is the maximum OAQ level above which demand ventilation will be disabled.

DIFF.AIR QUALITY LOLIMIT (AQD.L) — This is the differential CO_2 level at which IAQ control of the dampers will be initiated.

DIFF.AIR QUALITY HILIMIT (AQD.H) — This is the differential CO_2 level at which IAQ control of the dampers will be at maximum and the dampers will be at the MIN.P.

DAQ PPM FAN ON SETPOINT (DF.ON) — This is the CO_2 level at which the indoor fan will be turned on.

DAQ PPM FAN OFF SETPOINT (DF.OF) — This is the CO_2 level at which the indoor fan will be turned off.

IAQ LOW REFERENCE (I.4M) — This is the reference 4 to 20 mA signal level that will be used with a the IAQ sensor to correct for non-Carrier sensors that may have different characteristic curves. It represents the CO_2 level at 4 mA.

IAQ HIGH REFERENCE (I.20M) — This is the reference 4 to 20 mA signal level that will be used with a the IAQ sensor to correct for non-Carrier sensors that may have different characteristic curves. It represents the CO_2 level at 20 mA.

OAQ LOW REFERENCE (O.4M) — This is the reference 4 to 20 mA signal level that will be used with a the OAQ sensor to correct for non-Carrier sensors that may have different characteristic curves. It represents the CO_2 level at 4 mA.

OAQ HIGH REFERENCE (O.20M) — This is the reference 4 to 20 mA signal level that will be used with a the OAQ sensor to correct for non-Carrier sensors that may have different characteristic curves. It represents the CO_2 level at 20 mA.

DIFF.IAQ RESPONSIVENESS (I.CRV) — This is the configuration that is used to select the IAQ response curves as shown in Fig. 27.

Pre-Occupancy Purge — The control has the option for a pre-occupancy purge to clear the space prior to occupancy. The feature is enabled by the PRG.E variable which is located in the CONFIGURATION-IAQ submenu.

The IAQ Purge will operate under the following conditions:

- PRG.E is enabled
- the unit is in the unoccupied state
- Current Time is valid
- Next Occupied Time is valid
- time is within two hours of the next occupied period
- time is within the purge duration

If all of the above conditions are met, the following logic is used:

If (OAT >= NTLO and OAT <= OCSP and economizer is available)

Then PURGEMP = 100%

Else if (OAT < NTLO)

Then PURGEMP = LT.MP (default = 10%)

Else PURGEMP = HT.MP (default = 35%)

If PURGEMP > 0% then IAQ Purge Mode is enabled.

If this mode is enabled the indoor fan and heat interlock relay (VAV) will be energized and the economizer's minimum position is set to PURGEMP.

PURGEMP = 0% when IAQ purge mode is not active (enabled).

The following configurations are used for this option.

IAQ PURGE (PRG.E) — This is used to enable IAQ pre-occupancy purge. This can be configured in the CONFIGURATION-IAQ submenu.

IAQ PURGE LO TEMP MIN POS (PG.LT) — This is used to configure a low limit for damper position to be used during the purge mode This can be configured in the CONFIGURATION-IAQ submenu.

IAQ PURGE HI TEMP MIN POS (PG.HT) — This is used to configure a maximum position for the dampers to be used during the purge cycle. This can be configured in the CONFIGURATION-IAQ submenu.

NIGHT TIME LOCKOUT TEMP (NT.LO) — Night time lockout temperature below which the purge cycle will be disabled. This is configured in the SETPOINTS-COOL submenu.

Static Pressure Control — The control supports the use of an VFD for fan speed control and static pressure control. All VAV units are equipped with an VFD for the supply fan. The speed of the fan will be controlled directly by the *Comfort*Link™ Control. A duct static pressure sensor is located in the auxiliary control box The signal from the pressure sensor will be measure by the ECB2 board and will be used in a PID control routine in the *Comfort*Link Controls that will output a 4 to 20 mA signal to the VFD. The static pressure control set point (SP.SP) is in the SETPOINTS-SP.SP submenu. Other configurable variables that apply to static pressure control are listed below. These can be set in the CONFIGURATION-SVFD submenu.

The VFD also has configuration settings which are set at the VFD. These settings are shown in Tables 37 and 38.

The supply fan relay is not turned off when controlling a VFD. This is to prevent condensation on the VFD and associated electronics. The speed will be set to 0% when the unit is in the Off Mode.

DUCT STATIC PRESSURE SENSOR (SP.S) — This enables the use of a supply duct static pressure sensor. This must be enabled to use the *Comfort*Link control loop. If using a third party control for the VFD then this should be disabled.

STATIC PRESSURE CONTROL (SP.C) — This is used to configure the use of the *Comfort*Link for VFD control. It has the following options:

- NONE — No direct VFD control by *Comfort*Link control. This would be used if there was third-party control of the VFD. The control of the VFD must be provided.
- VFD CONTROL — This will enable the use of the *Comfort*Link VFD and static pressure control.

IDF VFD MINIMUM SPEED (SF.MN) — This is the minimum speed that the VFD will turn down to. The inverter also has a minimum speed adjustment.

IDF VFD MAXIMUM SPEED (SF.MX) — This is the maximum speed that the VFD can ramp up to. Usually this is set to 100%.

IDF SPEED IN FIRE MODE (SF.FS) — This is the speed that the VFD will use during the fire modes like pressurization, and purge.

PROP. GAIN SF VFD (SP.KP) — This is the proportional gain for the static pressure control PID control logic.

Table 37 — VFD (S9 Inverter) Configurations

TITLE	COMMUNICATION NUMBER	FUNCTION	DEFAULT SETTING	CARRIER SETTINGS	COMMENTS
CMOD	0003	Command Mode Selection	1	0	Auto Operation
FMOD	0004	Frequency Setting Mode Selection	2	0	Remote Operation
Fr	0008	Forward/Reverse Run Selection	0	1	Reverse run (required due to fan config)
ACC	0009	Acceleration Time 1	10	60	
DEC	0010	Deceleration Time 1	10	60	
FH	0011	Maximum Frequency	80	60	
UL	0012	Upper Limit Frequency	80	60	
Pt	0015	V/F Control Mode Selection	0	1	Variable torque load
F116	0116	Input Terminal Selection (S3)	8	11	Normally open E-Stop
F201	0201	VIA/II Input 1 Setting	0	20	0 Hz at 4 mA
F204	0204	V1A/II Input 2 Frequency	80	60	60 Hz at 20 mA
F300	0300	PWM Carrier Frequency	12	4	
F301	0301	Auto-Restart Control Selection	0	3	Auto -restart activated
F302	0302	Regenerative Power Ride through Control	0	1	Enable ride though
F303	0303	Retry Selection	0	2	Number of retrys
Sr1	0018	Pre-Set Speed 1	0	60	Fire Speed
OLN	0017	Electronic Thermal Protection		1	1=overload and stall protection

Table 38 — VFD (E3 Inverter) Configurations

SetP	SETUP PARAMETERS
ACC1	60.0 sec
DEC1	60.0 sec
UL	60.0 Hz
LL	0 Hz
lulu	1
P3	20%
F-P3	0.0 Hz
P4	100%
F-P4	60 Hz
tHr1	—
StC1	0
StL1	110%
OLN	1
tYP	5
Gr.F	**FUNDAMENTAL PARAMETERS**
FH	60Hz*
UL	60Hz
pt	2
GR.Fb	**FEEDBACK PARAMETERS**
FbP1	0*
Fbln	2
GP	0.3
GI	2 sec
GA	0
GFS	0 80
P1LL	10
PuL	1
PuU1	10
PuLL	10

GR.SF	FREQ. SETTING PARAMETERS
Fsor	60 Hz
Gr.Pn	**PANEL CONTROL PARAMETERS**
Fr	0*
FGr.St	**TERMINAL SELECTION PARAMETERS**
It	1
It0	0
It1	56
It2	13
It3	3
It4	10
GGr.Pr	**PROTECTION PARAMETERS**
UuC	1*
UuCt	2
ArSt	3
Gr.Ut	**UTILITY PARAMETERS**
Cnod	4*
Fnod	4*
bLPn	1*

*These settings differ from the Toshiba defaults and are required for Carrier applications.

DIFF. GAIN SF VFD (SP.KD) — This is the differential gain for the static pressure control PID control loop.

INTEGRAL GAIN SF VFD (SP.KI) — This is the integral gain for the static pressure PID control loop.

SYSTEM /GAIN SF VFD (SP.K) — This is the overall system gain for the static pressure PID control loop.

VFD PID TIME (SECONDS) (SP.DT) — This is the time factor for the static pressure control PID loop.

DUCT PRESS SENSOR HI END (SPHL) — This is the maximum static pressure that the sensor will measure when the signal is 20 mA.

DUCT PRESS SENSOR LO END (SPLL) — This is the minimum static pressure that the sensor will measure when the signal is 4 mA.

Under most operating conditions the control PID factors will not require any adjustment and the factory defaults should be used. If a condition is detected where the VFD speed is fluctuating up and down from the static pressure and it overshoots and undershoots the set point, then use the System Gain SF VFD (SP.K) factor. Decrease the factor a small amount to reduce the responsiveness of the control loop and increase it to increase the responsiveness of the control loop. Do not change the other factors without consulting with Carrier Application department.

Static Pressure Reset — The *Comfort*Link™ controls supports the use of static pressure reset. For static pressure reset to occur, the unit must be part of a CCN system with access to CCN reset variable and the Linkage Master Terminal System Logic.

The Linkage Master terminal monitors the primary air damper position of all the terminals in the system (done through LINKAGE with the new ComfortID™ air terminals). It then calculates the amount of supply static pressure reduction necessary to cause the most open damper in the system to open more than the minimum value (60%) but not more than the maximum value (90% or negligible static pressure drop). This is a dynamic calculation, which occurs every two minutes whenever the system is operating. The calculation ensures that the supply static pressure is always enough to supply the required airflow at the worst case terminal but never more than necessary, so that the primary air dampers do not have to operate with an excessive pressure drop (more than required to maintain the airflow set point of each individual terminal in the system). As the system operates, if the most open damper opens more than 90%, the system recalculates the pressure reduction variable and the value is reduced. Because the reset value is subtracted from the controlling set point at the equipment, the pressure set point increases and the primary air dampers close a little (to less than 90%). If the most open damper closes to less than 60%, the system recalculates the pressure reduction variable and the value is increased. This results in a decrease in the controlling set point at the equipment, which causes the primary air dampers to open a little more (to greater than 60%).

The rooftop unit has the design static pressure set point programmed into the CCN control. This is the maximum set point that could ever be achieved under any condition. To simplify the installation and commissioning process for the field, this system control is designed so that the installer only needs to enter a maximum duct design pressure or maximum equipment pressure, whichever is less. There is no longer a need to calculate the worst case pressure drop at design conditions and then hope that some intermediate condition does not require a higher supply static pressure to meet the load conditions. For example, a system design requirement may be 1.2 in. wg, the equipment may be capable of providing 3.0 in. wg and the supply duct is designed for 5.0 in. wg. In this case, the installer could enter 3.0 in. wg as the supply static pressure set point and allow the air terminal system to dynamically adjust the supply duct static pressure set point as required. The system will determine the actual set point required delivering the required airflow at every terminal under the current load conditions. It will always be the lowest value under the given conditions, and as the conditions and airflow set point at each terminal change throughout the operating period, and so will the equipment static pressure set point.

The CCN system must have access to a CCN variable (SPRESET which is part of the equipment controller). In the algorithm for static pressure control, the SPRESET value is always subtracted from the configured static pressure set point by the equipment controller. The SPRESET variable is always checked to be a positive value or zero only (negative values are clamped to zero). The result of the subtraction of the SPRESET variable from the configured set point is limited so that it cannot be less than zero.

The result is that the system will dynamically determine the required duct static pressure based on the actual load conditions currently in the space. It eliminates the need to calculate the design supply static pressure set point (although some may still want to do it anyway). It also saves the energy that is the difference between the design static pressure set point and the required static pressure (multiplied by the airflow). Normally, the VAV system operates at the design static pressure set point all the time, however, a typical VAV system operates at design conditions less than 2% of the time. A significant saving in fan horsepower can be achieved utilizing static pressure reset.

Building Pressure Control — The control will support control of the building pressure using power exhaust fans. The type of control is configured using the PWRX variable. The types are as follows:

PWRX = 0, No building pressure control

PWRX = 1, Building pressure control based on economizer position

PWRX = 2, Modulating building pressure control based on building pressure sensor

When PWRX is 1 or 2, there are either four or six power exhaust motors, attached to three relays. See Table 39.

Table 39 — Power Exhaust Fan Relays

UNIT SIZE	SETTING	PE_A RELAY	PE_B RELAY	PE_C RELAY
020-050	PWRM = 1 (4 motors)	1 Motor	2 Motors	1 Motor
060	PWRM = 2 (6 motors)	1 Motor	2 Motors	3 Motors

For a PWRX configuration of 1 the control will use the configurable PE Stage 1 Econo Position (PE1.P) and PE Stage 2 Econo Position (PE2.P) damper positions to operate two stages of power exhaust. For a 4-motor system the first stage of exhaust will energize PE-B and the second stage will energize all PE relays.

For a PWRX of 2 the control will use a building pressure sensor to control the sequencing of the power exhaust fans. A PID control loop will be used. This can be used on both VAV and CV units. The fan stages as shown in Table 40 will be used to control the measure building pressure to the configurable Building Pressure Set Point (BP.SP).

The control has 3 modes of running the fans for building pressure control mode. Option 2 should be used.

Table 40 — Modulating Power Exhaust Staging Sequence

SIZES 020-050

PWRM = 4	PE_A	PE_B	PE_C
Stage 0	OFF	OFF	OFF
Stage 1	ON	OFF	OFF
Stage 2	OFF	ON	OFF
Stage 3	ON	ON	OFF
Stage 4	ON	ON	ON

SIZE 060

PWRM = 6	PE_A	PE_B	PE_C
Stage 0	OFF	OFF	OFF
Stage 1	ON	OFF	OFF
Stage 2	OFF	ON	OFF
Stage 3	ON	ON	OFF
Stage 4	ON	OFF	ON
Stage 5	OFF	ON	ON
Stage 6	ON	ON	ON

BUILDING PRESSURE SET POINT (BP.SP) — This is the building pressure set point. It is located in the SETPOINT-BP.SP submenu.

POWER EXHAUST TYPE (PWRX) — This is the type of power exhaust and has the following options. It is located in the CONFIGURATION-ECON submenu.

- MODULATING — This will use the building pressure sensor.
- 2 STAGE — This will control the dampers based on the two configurable damper position set point.
- NONE — No building pressure control will be used. This should be set to NONE for barometric relief dampers.

POWER EXHAUST MOTORS (PWRM) — This configures the number of power exhaust fan motors and has the following options.

- 4 MOTORS — This should be used on all units except size 060.
- 6 MOTORS — This should be used on size 060 units.

PE STAGE 1 ECONO POSITION (PE1.P) — This is the damper position that will be used to turn on the first stage of fans when using 2 stage control.

PE STAGE 2 ECONO POSITION (PE2.P) — This is the damper position that will be used to turn on the second stage of fans when using 2 stage control.

MODULATING PE ALG SELECT (BP.SL) — This is a selection for different power exhaust control routines. Only routine 2 should be used.

BUILDING PRESSURE SENSOR (BP.S) — This is used to enable and disable the use of a building pressure sensor. It must be enabled for the modulating control to work. It can also be enable for the other modes where monitoring of the building pressure is desired.

BUILDING PRESSURE SENSOR HIGH END (BPHL) — This is used to configure the building pressure value that will correspond to a 20 mA signal from the sensor.

BUILDING PRESSURE SENSOR LOW END (BPLL) — This is used to configure the building pressure value that will correspond to a 4 mA signal from the sensor.

BP THRESHOLD ADJUSTMENT (BP.ZG) — This is a factor that is used to adjust the control PID loop. Normally this should not have to be adjusted.

BP PID EVALUATION (BP.DT) — This is a PID loop adjustment factor. Do not change this without direction from Application Engineering.

HIGH BP LEVEL (BP.HP) — This is the high limit for the routine 2 at which a fan stage will be added. Do not change this value.

LOW BP LEVEL (BP.LP) — This is the low limit for the routine 2 at which a fan stage will be removed. Do not change this value.

Space Temperature Offset — The control provides capability for CV units to offset a space temperature set point by ± 1 to10 F, using a T56 device. The T56 slider analog input is linearized by the software into the –(1-10) to +(1-10) F range, and uses the STO.R configuration to set the range which is located in the CONFIGURATION-OPTS submenu and the Space Temperature Offset (SPTO) read the offset value. The SPTO can be read in the TEMPERATURE-UNIT submenu.

The SPTO offset is applied to the error term during the occupied period only.

It will be applied as follows:

The error term equals the occupied set point (OCSP or OHSP) + SPTO – SPT.

NOTE: This must be used with HVACSPT2 control.

Temperature Compensated Start — This logic is used when the unit is in unoccupied state. It will calculate early Start Bias time based on Space Temperature deviation from occupied set points. This will allow the control to learn when to start the unit so that the space is at conditioned levels when the occupied period starts. This is required for ASHRAE 90.1 compliance.

The following conditions must be met for the algorithm to run:

- Unit in unoccupied state
- Next occupied time is valid
- Current time of day is valid
- Valid Space Temperature reading is available (sensor or DAV-Linkage)

The algorithm will calculate Start Bias time (BIASTIME) in minutes using the following equations:

If (space temperature > occupied cooling set point)

BIASTIME = (space temperature – occupied cooling set point)* C.TC.F

If (space temperature < occupied heating set point)

BIASTIME = (occupied heating set point – space temperature)* H.TC.F

When BIASTIME > 0 the algorithm will subtract it from the next occupied time to calculate the new start time. When the new start time is reached, the Temperature Compensated Start mode is set, the fan is started and the unit controlled as in occupied state. Once set, Temperature Compensated Mode will stay on until the unit goes into occupied mode. The Start Bias Time will be written into the Linkage Equipment Table if the unit is controlled in DAV mode.

If Unoccupied Economizer Free Cool mode is active (MODEUEFC) when Temperature Compensated Start begins, the Unoccupied Free Cool mode will be stopped.

The following configurations are required for this logic:

TCST COOL TIME/TEMP FACT (C.TC.F) — This is located in the CONFIGURATION-COOL submenu and is the factor for the start time bias equation for cooling.

TCST HEAT TIME/TEMP FACT (H.TC.F) — This is located in the CONFIGURATION-HEAT submenu and is the factor for the start time bias equation for heating.

Smoke Control Modes — There are four smoke control modes that can be used to control smoke within areas serviced by the unit: Pressurization Mode, Evacuation Mode, Smoke Purge Mode, and Fire Shutdown. Evacuation, Pressurization and Smoke Purge modes require the Controls Expansion Board (CEM). The Fire Shutdown input is located on the main board (MBB) on terminals TB5-10 and TB5-11. The unit may also be equipped with a factory-installed return air Smoke Detector that is wired to TB5-10,11 and will shut the unit down if a smoke condition is determined. On terminal TB5-8 and 9, field-monitoring wiring can be connected to also monitor the smoke detector.

Once in a fire shutdown condition, additional inputs on the CEM board can be used to put the unit in the Pressurization, Evacuation, and Smoke Purge Modes. These switches or inputs are connected to TB6 as shown below and on Fig. 7.

Pressurization — TB5-12 and 13

Evacuation — TB5-13 and 14

Smoke Purge — TB5-13 and 15

Each mode must be energized individually on discrete inputs and the corresponding alarm is initiated when a mode is activated. The fire system provides a normally closed dry contact closure.

FIRE SHUTDOWN MODE — This mode causes the complete shutdown of the unit.

PRESSURIZATION MODE — This mode attempts to raise the pressure of a space to prevent smoke infiltration from another space. The space with smoke should be in an Evacuation Mode attempting to lower its pressure. Opening the economizer (thereby closing the return air damper), shutting down power exhaust and turning the indoor fan on will increase pressure in the space.

EVACUATION MODE — This mode attempts to lower the pressure of the space to prevent infiltrating another space with its smoke. Closing the economizer (thereby opening the return air damper), turning on the power exhaust and shutting down the indoor fan decrease pressure in the space.

SMOKE PURGE MODE — This mode attempts to draw out smoke from the space after the emergency condition. Opening the economizer (thereby closing the return air damper), turning on both the power exhaust and indoor fan will evacuate smoke and bring in fresh air.

The following configurations apply to the fire and smoke control operation.

IDF SPEED IN FIRE MODE (SF.FS) — This is the VFD speed that will be used when the fire pressurization and purge modes are enabled. To use this, the unit must be configured with the Static Pressure Control (SP.C) variable set to VFD control. This method should be used instead of tying in to the VFDs which also have a means for fire override control.

EVACUATION SW NORMALLY (EVC.L) — This is located in the CONFIGURATION-SW.LG submenu and is used to configure the normally open/closed status of the switch.

FILTER STATUS NORMALLY (FTS.L) — This is located in the CONFIGURATION-SW.LG submenu and is used to configure the normally open/closed status of the switch.

FIRE SHUTDOWN NORMALLY (FSD.L) — This is located in the CONFIGURATION-SW.LG submenu and is used to configure the normally open/closed status of the switch.

IAQ DISC. INPUT NORMALLY (IAQ.L) — This is located in the CONFIGURATION-SW.LG submenu and is used to configure the normally open/closed status of the switch.

PRESS. SWITCH NORMALLY (PRS.L) — This is located in the CONFIGURATION-SW.LG submenu and is used to configure the normally open/closed status of the switch.

SMOKE PURGE SW. NORMALLY (PRG.L) — This is located in the CONFIGURATION-SW.LG submenu and is used to configure the normally open/closed status of the switch.

Fan Status Monitoring — The fan status switch is an option that allows for the monitoring of a discrete switch, which trips above a differential pressure drop across the supply fan. For units with VFDs not controlled by third parties, it is possible to measure duct pressure rise directly, which would remove the need for this option.

There is a configuration, which selects the type of fan status monitoring (IF.M) to be performed. Possible configurations are: NONE — No switch or monitoring, SWITCH — Use of the fan status switch, DELTA PRESS — Monitoring of the supply duct pressure.

As the unit will always protect itself, there is also a configuration which will allow for the fan status to alarm and shut down the unit or simply send out an alert. This configuration is called Fan Fail Shuts Down Unit (IS.FS) and is located in the CONFIGURATION-UNIT submenu. If enabled, it will shut down the unit if a failure is detected.

To allow for flexibility in choosing third party fan status switches, a configuration is provided that reverses the logic state read based on whether the switch is normally open (NO) or normally closed (NC). This variable is called Fan Status SW. Normally: (SFS.L) and is located in the CONFIGURATION-SW.LG submenu.

Dirty Filter Switch — The unit can be equipped with a factory or field installed accessory dirty filter switch. The switch is located in the auxiliary control box.

If no dirty filter switch is installed, the switch input is designed to read clean all the time. Therefore, the dirty filter routine runs all the time.

The dirty filter routine waits for 2 minutes of fan operation before the dirty filter switch is monitored.

After 2 minutes, if the dirty filter switch reads "bad" for 2 continuous minutes, the alert is generated.

Recovery from this alert is done through a clearing of all alarms or after cleaning the filter.

Remote Control Switch Input — The remote switch input located on the ECB-1 board and connected to TB6 terminals 1 and 3. The switch can be used for several remote control functions.

The switch is configured using the Remote Switch Config (RMT.C), which is located in the CONFIGURATION-OPTS submenu. The configurations are:

- NONE — Switch will not be used.
- OCCUPANCY — Switch will be used to signal occupied/unoccupied modes.
- START STOP — Switch will be configured for start-stop control of the unit.

The control also allows for the configuration of the normally open/closed status of the switch. This is configured using Remote Switch Normally (PMI.L) variable, which is located in the CONFIGURATION-SW.LG submenu.

Control Level Forcing — If any of the following points are forced with a priority level of 7, the software clears the force from the point if it has not been written to or forced again within the timeout periods defined below:

Time out periods:

OAT	30 minutes	Outside Air Temperature
OAQ	30 minutes	Outside Air Quality
OARH	30 minutes	Outside Air Relative Humidity
SPT	3 minutes	Space Temperature
SPRESET	30 minutes	Static Pressure Reset

Test Mode — The control can test the outputs. This can be used during start-up and also during diagnostic investigations.

There are four major test mode categories: Independent, Fans, Cooling, and Heating. Within each category there are submenu items and functions. These are summarized in Table 13 and the Service Test Menu.

This routine is enabled using the SERVICE-TEST submenu. The user will be required to enter the password.

Alarms and Alerts — There are a variety of different alerts and alarms in the system.

P — Pre-Alert: Part of the unit is temporarily down. The alarm is not broadcast on the CCN Network. The alarm relay is not energized. After an allowable number of retries, if the function does not recover, the pre-alert will be upgraded to an alert or an alarm.

T — Alert: Part of the unit is down, but the unit is still partially able to provide cooling or heating.

A — Alarm: The unit is down and is unable to provide cooling or heating.

All alarms are displayed with a code of AXXX where the A is the category of alarm (Pre-Alert, Alert, or Alarm) and XXX is the number.

The response of the control system to various alerts and alarms depends on the seriousness of the particular alert or alarm. In the mildest case, an alert does not affect the operation of the unit in any manner. An alert can also cause a "strike." A "striking" alert will cause the circuit to shut down for 15 minutes. This feature reduces the likelihood of false alarms causing a properly working system to be shutdown incorrectly. If three strikes occur before the circuit has an opportunity to show that it can function properly, the circuit will strike out, causing the shutdown alarm for that particular circuit. Once activated, the shutdown alarm can only be cleared via an alarm reset.

Circuits with strikes are given an opportunity to reset their strike counter to zero. As discussed above, a strike typically causes the circuit to shut down. Fifteen minutes later, that circuit will once again be allowed to run. If the circuit is able to run for 1 minute, its replacement circuit will be allowed to shut down (if not required to run to satisfy requested stages). However, the "troubled" circuit must run continuously for 5 minutes with no detectable problems before the strike counter is reset to zero.

All the alarms and alerts are summarized in Table 41.

Operators with CCN networks might not want to be notified of "striking" alerts until a circuit has been shut down because of three alerts. If the operator sets A.NOW (Alarm Now) to NO, alerts will not be announced until a circuit is permanently shut down. This implies that alarm will not be broadcast on the CCN network or listed on the display until a permanent shut down alarm occurs.

The status of A.NOW is ignored during Service Test mode because it is presumed that the service technician will want to be notified of any alerts or alarms immediately. So it will not confuse a monitor center, the words "SERVICE TEST" are inserted into every alarm message while the unit is operating in Service Test Mode.

Table 41 — Alert and Alarm Codes

ALARM OR ALERT NUMBER	DESCRIPTION	ACTION TAKEN BY CONTROL	RESET METHOD	PROBABLE CAUSE
A051	A051 Circuit A, Compressor 1 Current Detected After Shutdown	Turn off all compressors	Manual	Welded Contact
P051	Compressor A1 Safety Trip	Add strike to Compressor	Automatic (max 3)	High pressure switch, compressor current, wiring error
T051	Circuit A, Compressor 1 Failure	Compressor locked off	Manual	Exceeded 3 strike limit
A052	Circuit A, Compressor 2 Current Detected After Shutdown	Turn off all compressors	Manual	Welded Contact
P052	Circuit A, Compressor 2 Failure	Add strike to Compressor	Automatic (max 3)	High pressure switch, compressor current, wiring error
T052	Circuit A, Compressor 2 Failure	Compressor locked off	Manual	Exceeded 3 strike limit
A055	Circuit B, Compressor 1 Current Detected After Shutdown	Turn off all compressors	Manual	Welded Contact
P055	Circuit B, Compressor 1 Failure	Add strike to Compressor	Automatic (max 3)	High pressure switch, compressor current, wiring error
T055	Circuit B, Compressor 1 Failure	Compressor locked off	Manual	Exceeded 3 strike limit
A056	Circuit B, Compressor 2 Current Detected After Shutdown	Turn off all compressors	Manual	Welded Contact
P056	Circuit B, Compressor 2 Failure	Add strike to Compressor	Automatic (max 3)	High pressure switch, compressor current, wiring error
T056	Circuit B, Compressor 2 Failure	Compressor locked off	Manual	Exceeded 3 strike limit
T064	Circuit A Saturated Condensing Thermistor Failure	Use OAT for head pressure control	Automatic	Faulty thermistor or wiring error
T065	Circuit B Saturated Condensing Thermistor Failure	Use OAT for head pressure control	Automatic	Faulty thermistor or wiring error
T072	Remote Setpoint/Reset Input Failure	Unit Shutdown	Automatic	Faulty remote input on CEM board
T073	Outside Air Temperature Thermistor Failure	Stop use of economizer	Automatic	Faulty thermistor or wiring error
T074	Space Temperature Thermistor Failure	Unit Shutdown	Automatic	Faulty thermistor or wiring error
T075	Return Air Thermistor Failure	Continue to run unit	Automatic	Faulty thermistor or wiring error
T076	Outside Air Relative Humidity Sensor Failure	Use OAT changeover control	Automatic	Faulty sensor or wiring error
T077	Space Relative Humidity Sensor Failure	not used at this time		
T078	Return Air Relative Humidity Sensor Failure	Use differential drybulb changeover	Automatic	Faulty sensor or wiring error
T082	Space Temperature Offset Sensor Failure	Use Space temperature without offset	Automatic	Faulty sensor or wiring error
A083	Evaporator Discharge Temperature Sensor Failure	Stop Unit	Automatic	Faulty sensor or wiring error
T092	Circuit A Suction Pressure Transducer Failure	Stop circuit	Automatic	Faulty sensor, wiring error
T093	Circuit B Suction Pressure Transducer Failure	Stop circuit	Automatic	Faulty sensor, wiring error
T110	Circuit A Loss of Charge	Stop circuit	Manual	Low refrigerant charge
T111	Circuit B Loss of Charge	Stop circuit	Manual	Low refrigerant charge
A120	Circuit A Low Saturated Suction Temperature Alarm.	Stop circuit	Manual	Low refrigerant charge, low airflow, dirty coil, broken fan belt, TXV problem
T120	Circuit A Low Saturated Suction Temperature Alert.	Stop circuit	Automatic	Low refrigerant charge, low airflow, dirty coil, broken fan belt, TXV problem
A121	Circuit B Low Saturated Suction Temperature Alarm.	Stop circuit	Manual	Low refrigerant charge, low airflow, dirty coil, broken fan belt, TXV problem
T121	Circuit B Low Saturated Suction Temperature Alert.	Stop circuit	Automatic	Low refrigerant charge, low airflow, dirty coil, broken fan belt, TXV problem
T122	Circuit A High Saturated Suction Temperature	Stop circuit	Manual	TXV problem
T123	Circuit B High Saturated Suction Temperature	Stop circuit	Manual	TXV problem
T126	Circuit A High Head Pressure	Stop circuit	Automatic	Dirty condenser, condenser fan failure
T127	Circuit B High Head Pressure	Stop circuit	Automatic	Dirty condenser, condenser fan failure
A140	Reverse Rotation Detected	Stop unit	Manual	Power phased wrong
A150	Unit is in Emergency Stop	Stop units	Manual	External shutdown command
A151	Illegal Configuration	Stop unit	Manual	Unit configured wrong, check configuration
A151	Illegal Configuration - More Than Two Elec. Heat Stages	Stop unit	Manual	Unit configured wrong, check configuration
A151	Ill Config. - Number of Heat Stages Must be 0, 2, 4, or 6	Stop unit	Manual	Unit configured wrong, check configuration
A152	Unit Down due to Failure	Stop unit	Manual	
T153	Real Time Clock Hardware Failure	Stop unit	Manual	Control Board failure, check lights
A154	Serial EEPROM Hardware Failure	Stop unit	Manual	Control Board failure, check lights
T155	Serial EEPROM Storage Failure Error	Stop unit	Manual	Control Board failure, check lights
A156	Critical Serial EEPROM Storage Failure Error	Stop unit	Manual	Control Board failure, check lights
A157	A/D Hardware Failure	Stop unit	Manual	Control Board failure, check lights
A163	Circuit A Failure	Stop circuit	Manual	Exceeded 3 strike limit
A164	Circuit B Failure	Stop circuit	Manual	Exceeded 3 strike limit
A165	Circuit C Failure	Stop circuit	Manual	Exceeded 3 strike limit

Table 41 — Alert and Alarm Codes (cont)

ALARM OR ALERT NUMBER	DESCRIPTION	ACTION TAKEN BY CONTROL	RESET METHOD	PROBABLE CAUSE
A171	Loss of communications with the staged Gas control board	Stop gas heat	Automatic	Control Board failure, check lights
T172	Loss of communications with the Control Expansion Board	Stop options on CEM	Automatic	Control Board failure, check lights
A173	Loss of communications with the ECB1 Board	Stop economizer & power exh	Automatic	Control Board failure, check lights
A174	Loss of communications with the ECB2 board	Stop unit	Automatic	Control Board failure, check lights
T177	4-20 MA Demand Limit Failure	Stop demand limiting	Automatic	Input failure, wiring error
A200	Linkage Timeout Error - Loss of Communication	Stop unit	Manual	Wiring errors, board failures
T210	Building Pressure Transducer Failure	Close economizer, stop exhaust	Automatic	Sensor failure, wiring error
T211	Static Pressure Transducer Failure	Stop unit	Automatic	Sensor failure, wiring error
T220	Indoor Air Quality Sensor Failure	Stop IAQ control	Automatic	Sensor failure, wiring error
T221	Outdoor Air Quality Sensor Failure	Use a default value for IAQ	Automatic	Sensor failure, wiring error
T229	Economizer Minimum Position Override Sensor Failure	Use software configured minimum	Automatic	Input failure, wiring error
T245	Outside Air CFM Sensor Failure	not used at this time		not used
T246	Supply Air CFM Sensor Failure	not used at this time		not used
T247	Return Air CFM Sensor Failure	not used at this time		not used
T300	Space Temperature Below Limit	Stop cooling, but continue to heat	Automatic	Outdoor dampers stuck, no load
T301	Space Temperature Above Limit	Stop heating, but continue to cool	Automatic	High load, dampers open
T302	Supply Temperature Below Limit	Continue to run unit	Automatic	Dampers open, check configuration setpoint
T303	Supply Temperature Above Limit	Continue to run unit	Automatic	Dampers open, check configuration setpoint
T304	Return Temperature Below Limit	Continue to run unit	Automatic	Dampers open, check configuration setpoint
T305	Return Temperature Above Limit	Continue to run unit	Automatic	Dampers open, check configuration setpoint
T308	Return Air Relative Humidity Below Limit	Alert	Automatic	Configuration error, or sensor error
T309	Return Air Relative Humidity Above Limit	Continue to run unit	Automatic	Dampers open, check configuration setpoint
T310	Supply Duct Static Pressure Below Limit	Continue to run unit	Automatic	VFD problem, broken fan belt
T311	Supply Duct Static Pressure Above Limit	Continue to run unit	Automatic	VFD problem, broken fan belt
T312	Building Static Pressure Below Limit	Continue to run unit	Automatic	Exhaust issues, check setpoint
T313	Building Static Pressure Above Limit	Continue to run unit	Automatic	Exhaust issues, check setpoint
T314	IAQ Above Limit	Continue to run unit	Automatic	Damper or IAQ control issues
A404	Fire Shut Down Emergency Mode (fire-smoke)	Unit Shutdown	Automatic	Smoke detector switch or external switch
A405	Evacuation Emergency Mode	Run power exhaust	Automatic	Special fire mode control
A406	Pressurization Emergency Mode	Run supply fan	Automatic	Special fire mode control
A407	Smoke Purge Emergency Mode	Run supply and exhaust fans	Automatic	Special fire mode control
T408	Dirty Air Filter	Continue to run unit	Automatic	Dirty filter, switch setting
A409	Supply Fan Status Failure	Stop unit	Automatic	Fan drive failure
T409	Supply Fan Status Failure	Continue to run unit	Automatic	Fan drive failure, or sensor failure
T414	Loss of Communication with the Belimo Actuator	Close economizer	Automatic	Calibrate economizer, economizer failure, wiring
T414	Belimo Actuator Direction Error	Close economizer	Automatic	Motor direction switch wrong, wiring
T414	Belimo Actuator Failure	Attempt to close economizer	Automatic	Motor failure
T414	Belimo Actuator Hunting Alert	Close economizer	Automatic	Motor moving too often
T414	Belimo Actuator Jammed	Attempt to close economizer	Automatic	Damper or motor drive issues
T414	Belimo Actuator Range Error	Close economizer	Automatic	Calibrate economizer
T414	Belimo Actuator Torque Error	Close economizer	Automatic	Damper or drive issues
T420	R-W1 Jumper Must Be Installed to Run Heat in Service Test	No heat	Automatic	Add red wire jumpers
T421	Thermostat Y2 Input Activated without Y1 Activated	Assume Y2 is Y1	Automatic	Thermostat wiring error
T422	Thermostat W2 Input Activated without W1 Activated	Assume W2 is W1	Automatic	Thermostat wiring error
T423	Thermostat Y and W Inputs Activated Simultaneously	Alert	Automatic	Thermostat issues
T424	Thermostat G Input Not Seen on a Call for Cooling	Turn fan on	Automatic	Thermostat or wiring issues
T500	Current Sensor Board Failure - A1	Stop compressor A1	Automatic	Faulty board or wiring
T501	Current Sensor Board Failure - A2	Stop compressor A2	Automatic	Faulty board or wiring
T502	Current Sensor Board Failure - B1	Stop compressor B1	Automatic	Faulty board or wiring
T503	Current Sensor Board Failure - B2	Stop compressor B2	Automatic	Faulty board or wiring
A700	Supply Air Temperature Sensor Failure	Stop staged gas heat	Automatic	Faulty sensor or wiring error
T701	Supply Air Temperature Thermistor 1 Failure	Stop staged gas heat	Automatic	Faulty sensor or wiring error
T702	Supply Air Temperature Thermistor 2 Failure	Stop staged gas heat	Automatic	Faulty sensor or wiring error
T703	Supply Air Temperature Thermistor 3 Failure	Stop staged gas heat	Automatic	Faulty sensor or wiring error
A704	Staged Gas Leaving Air Temp Sum Total Failure	Stop staged gas heat	Automatic	Faulty sensor or wiring error

DIAGNOSTIC ALARM CODES AND POSSIBLE CAUSES

Alert Codes 51, 52, 55 and 56 (Compressor Safety) — Alert codes 51, 52, 55, and 56 are for compressors A1, A2, B1, and B2 respectively. These alerts occur when the Current Sensor (CS) does not detect compressor current during compressor operation. When this occurs, the control turns off the compressor and logs a strike for the respective circuit. These alerts reset automatically.

The possible causes are:

- High-pressure switch (HPS) open. The HPS-pressure switch is wired in series with compressor relays on the MBB. If the high-pressure switch opens during compressor operation, the compressor stops, and the CS no longer detects current, causing the control to activate this alert.
- Compressor internal overload protection is open. The internal overloads are used on the Scroll Tech compressors (black) and smaller Maneurop compressors used on the 020, 025, 027, 030, 035 units and 040 A1, A2 compressors.
- Internal compressor temperature sensor trip. The large Maneurop compressors (blue) used on the 040 B1, B2, 050, and 060 units have an internal temperature sensor.
- Circuit Breaker trip. The compressors are protected from short circuit by a breaker in the control box. On the 020-035 and 040 A1, A2 units there is one breaker per two compressors and on the 040 B1, B2 and 050, 060 compressors there is one breaker per compressor because there is not internal overloads.
- Wiring error. A wiring error might not allow the compressor to start.

To check out alerts 51, 52, 55 and 56:

1. Turn on the compressor in question using Service Test mode. If the compressor does not start, then most likely the problem is one of the following: HPS open, open internal protection, circuit breaker trip, incorrect safety wiring, or incorrect compressor wiring.
2. If the compressor does start verify it is rotating in the correct direction.

IMPORTANT: Prolonged operation in the wrong direction can damage the compressor. Correct rotation can be verified by a gage set and looking for a differential pressure rise on start-up.

3. If the compressor starts, verify that the indoor and outdoor fans are operating properly.
4. If the CS is always detecting current, then verify that the compressor is on. If the compressor is on, check the contactor and the relay on the MBB. If the compressor is off and there is no current, verify CS wiring and replace if necessary.
5. Return to Normal mode and observe compressor operation to verify that compressor current sensor is working and condenser fans are energized after compressor starts.

Alert Codes 51, 52, 55 and 56 (Current Detected After Turnoff) — Alert codes 51, 52, 55, and 56 are for compressors A1, A2, B1, B2 respectively. These alerts occur when the Current Sensor, (CS) detects current when the compressor should be off. When this occurs, the control turns off the compressor and logs a strike for the respective circuit. Use the Scrolling Marquee to reset the alert.

The possible causes are:

- Welded contactor.
- Frozen compressor relay on MBB.

To check out alerts 51, 52, 55, and 56

1. Place the unit in Service Test Mode. All compressors should be Off.
2. Verify that there is not 24V at the contactor coil. If there is 24V at the contactor, check relay on MBB and wiring.
3. Check for welded contactor.
4. Verify CS wiring.
5. Return to Normal mode and observe compressor operation to verify that compressor current sensor is working and condenser fans are energized after compressor starts.

Alert Codes 64, and 65 (Condensing Temp. Failure) — Alert codes 64, and 65 are for circuits A and B respectively. These alerts occur when the saturated condensing temperatures (SCT.A and SCT.B) are outside the range –40 to 240 F (–40 to 116 C). When this occurs, the control uses the outdoor temperature (OAT) to control the outdoor fans. The control will default to control based on the OAT sensor and will turn on OFC.B when the ambient is above 65 F and off when the ambient is below 50 F.

If the SCT and OAT sensors have all failed then the control should turn on OFC.B when compressors are on.

The cause of the alert is usually a faulty thermistor, a shorted or open thermistor caused by a wiring error, or a loose connection.

Alert Code 72 (Remote Setpoint/Rest Input Failure) — If the unit is configured to use the Remote Supply Air Set Point/ Reset 4 to 20 mA (RM.SP) and the sensor reading is less than 2 mA or greater than 22 mA then the alert will occur. When this occurs the control will default to the internal set points. The sensor is connected to the optional CEM module. For this sensor to be used, the EDT Reset Input (EDT.R) must be set to enable. This is located in the CONFIGURATION-OPTS submenu.

Alert Code 73 (Outside Air Temp. Failure) — This alert occurs when the outside air temperature sensor (OAT) is outside the range –40 to 240 F (–40 to 116 C). This alert resets automatically. The cause of the alert is usually a faulty thermistor, a shorted or open thermistor caused by a wiring error, or a loose connection.

Alert Code 74 (Space Temp. Failure) — This alert occurs when the space temperature sensor (SPT) is outside the range –40 to 240 F (–40 to 116 C). This alert will only occur if the unit is configured to use a space temperature sensor. Configuration is done through the Unit Control Type (CTL.T) configuration, which is located in the CONFIGURATION-UNIT submenu. The unit will shut down if this alert occurs while in Space Sensor mode. This alert resets automatically. The cause of the alert is usually a faulty thermistor in the T55, T56, or T58 device, a shorted or open thermistor caused by a wiring error, or a loose connection.

Alert Code 75 (Return Air Temp. Failure) — This alert occurs when the return air temperature sensor (RAT) is outside the range –40 to 240 F (–40 to 116 C). The RAT is standard on all units and is located in the return section near the auxiliary control box. This alert resets automatically. The cause of the alert is usually a faulty thermistor, a shorted or open thermistor caused by a wiring error, or a loose connection.

Alert Code 76 (Outside Air Relative Humidity Sensor Failure) — This alert occurs when the outside air humidity sensor (OA.RH) has a reading less than 2 mA or greater than 22 mA. The OA.RH sensor is located in the economizer hood and is used for control of the economizer. The sensor is a loop powered 4 to 20 mA sensor. This alert resets automatically. The cause of the alert is usually a faulty sensor, a shorted or open sensor caused by a wiring error, or a loose connection. The unit must be configured to use the sensor through the Outside Air RH Sensor (ORHS) setting, which is located in the CONFIGURATION (OPTS) submenu.

Alert Code 78 (Return Air Relative Humidity Sensor Failure) — This alert occurs when the return air humidity sensor (RA.RH) has a reading less than 2 mA or greater than 22 mA. The RA.RH sensor is located in the return air section near the auxiliary control box. The sensor is a loop powered 4 to 20 mA sensor. This alert resets automatically. The cause of the alert is usually a faulty sensor, a shorted or open sensor caused by a wiring error, or a loose connection. The unit must be

configured to use the sensor through the Outside Air RH Sensor (RRHS) setting, which is located in the CONFIGURATION-OPTS submenu.

Alert Code 82 (Space Temperature Offset Failure) — If the unit is configured to use a space temperature sensor and is using a T56 sensor with an offset potentiometer, then the alert will occur if the potentiometer is outside the allowable range. The control will default to the software applicable set point. The alert will automatically clear. The unit must be configured for one of the SPT control options through the Unit Control Type (CTL.T) configuration, which is located in the CONFIGURATION-UNIT submenu.

Alarm Code 83 (Evaporator Discharge Sensor Failure) — This alarm occurs when the Evaporator Discharge temperature sensor (EDT) is outside the range –40 to 240 F (–40 to 116 C). The EDT sensor is located on the side of the supply air fan. This alarm resets automatically. The cause of the alarm is usually a faulty thermistor, a shorted or open thermistor caused by a wiring error, or a loose connection. Because the sensor controls many of the functions in the unit, all cooling will be stopped until the failure is corrected.

Alert Codes 92, 93, (Suction Pres. Trans. Failure) — Alert codes 92, and 93 are for circuits A and B respectively. These alerts occur when the pressure is outside the range 0.5 to 134.5 psig. A circuit cannot run when this alert is active. Use the Scrolling Marquee to reset the alert. The cause of the alert is usually a faulty transducer, faulty 5-V power supply, or a loose connection.

Alert Codes 110, 111 (Loss of Charge) — Alert codes 110, and 111 are for circuits A, and B respectively. These alerts occur when the compressor is OFF and the suction pressure < 5 psig and OAT > –5 F for 1 continuous minute. Use the Scrolling Marquee to reset the alert. The cause of the alert is usually low refrigerant pressure or a faulty suction pressure transducer. These alerts only occur when the compressor is OFF because the low refrigerant pressure alarms (alerts 133, and 134) handle this situation when the compressors are operating.

Alert and Alarm Code 120, 121 (Low Saturated Suction Temperature) — Alert codes 120 and 121 are used to protect the coil from freeze-up during operation. Alert 120 is for circuit A and 121 for circuit B. If the saturated suction temperature is less than 28 F for 15 minutes, less than 20 F for 5 minutes, or less than 5 F for 20 continuous seconds then the alert will occur for the appropriate circuit. The circuit will be allowed to restart in 15 minutes. If more than three alerts occur then the circuit will be locked out and an alarm is generated. If the saturated suction is greater than 34 F for more than one hour then the counter will be reset.

Alert Code 122 and 123 (High Saturated Suction Temperature) — Alert codes 122 and 123 occur when compressors in a circuit have been running for at least 5 minutes and the circuit saturated suction is greater than 60 F. The high saturated suction alert is generated and the circuit is shut down. This condition resets after OAT drops by 5 F. Alert code 122 is for circuit A and 123 for circuit B.

Alert Codes 126, 127 (High Refrigerant Pressure) — Alert codes 126, and 127 are for circuits A and B respectively. These alerts occur when alerts 51, 52, 55, or 56 are active and the appropriate condensing temperature is greater than 150 F. These alerts reset automatically. The cause of the alarm is usually an overcharged system, high outdoor ambient temperature coupled with dirty outdoor coil, plugged filter drier, or a faulty high pressure switch. See Alerts 51, 52, 55 and 56 for diagnostic procedure.

Alarm Code 140 (Reverse Rotation Detected) — When a compressor starts in either circuit, the control monitors the discharge and suction pressure. If a rise in differential is not detected, then the circuit will be stopped and the circuit locked off. This will require a manual reset through the Scrolling Marquee display.

Alarm Code 150 (Unit in Emergency Stop) — If the fire safety input condition occurs to indicate a fire or smoke condition, then Alarm code 150 will occur and the unit will be immediately stopped. Through separate inputs the unit can be put into purge, evacuation, and pressurization. This requires a manual reset.

Alarm Code 151 — Illegal Configuration — If an illegal configuration has been set, then alarm code 151 will occur and the unit will not be allowed to run. Check the unit configurations and make the appropriate corrections.

Alarm Code 152 Unit Down Due to Failure — If there is a general fault condition with one of the boards or software, then the general alarm code 152 will be displayed. Reset the power and check the operation of the boards using the indicator lights on the boards. This is a manual reset alarm.

Alert Code 153 — Real Time Clock Hardware Failure — A problem has been detected with the real timeclock on the MBB. Try resetting the power and check the indicator lights. If the alert continues, the board should be replaced.

Alarm Code 154 — Serial EEPROM Hardware Failure — A problem has been detected with the EEPROM on the MBB. Try resetting the power and check the indicator lights. If the alarm continues, the board should be replaced.

Alert Code 155 — Serial EEPROM Storage Error — A problem has been detected with the EEPROM storage on the MBB. Try resetting the power and check the indicator lights. If the alert continues, the board should be replaced.

Alarm Code 156 — Critical Serial EEPROM Storage Error — A problem has been detected with the EEPROM storage on the MBB. Try resetting the power and check the indicator lights. If the alarm continues, the board should be replaced.

Alarm Code 157 — A/D Serial EEPROM Storage Failure Error — A problem has been detected with A/D conversion on the boards. Try resetting the power and check the indicator lights. If the alarm continues, the board should be replaced.

Alarm Codes 163, 164, 165 (Circuit Failure) — Alarm codes 163, 164, and 165 are for circuits A, B, and C, respectively. These alarms occur when a circuit has 3 strikes. Use the Scrolling Marquee display to reset the alarm. Investigate the alarm that caused the strikes to occur.

Alarm Code 171 — Loss of Communications with the Staged Gas Control Board — This alarm indicates that there are communications problems with the staged gas heat control board, which is located in the gas section on units equipped with staged gas heat. If this alarm occurs, the staged gas heat will be disabled. The alarm will automatically reset.

Alarm Code 172 — Loss of Communications with the Controls Expansion Board — This alarm indicates that there are communications problems with the Controls Expansion Board. All functions performed by the CEM will stop, which can include demand limit, reset, fire control modes, and the fan status switch. The alarm will automatically reset.

Alarm Code 173 — Loss of Communications with the ECB1 — This alarm indicates that there are communications problems with the Economizer Control Board. This will result in the economizer and the power exhaust not working and the dampers to be fully closed. The exhaust fans will stop. The alarm will automatically reset.

Alarm Code 174 — Loss of Communications with the ECB2 — This alarm indicates that there are communications problems with the ECB2 which controls the VAV unit indoor fan inverter speed and hot gas bypass on CV and VAV units. Because the control of the fan is critical to unit operation, the unit will be stopped. The alarm will automatically reset.

Alert Code 177 (4-20 mA Demand Limit Failure) — This alert indicates a problem with the optional remote 4 to 20 mA demand limit signal (DM.AI) that is connected to the CEM module. If this occurs, then demand limiting will be disabled. The unit must be configured for 4 to 20 mA Demand Limiting using the Demand Limit Select (DMLS).

Alarm Code 200 (Linkage Timeout Error — Loss of Communications) — An error has occurred with communications between boards. Check wiring and reset controls.

Alert Code 210 (Building Pressure Transducer Failure) — If the signal from the 4 to 20 mA building pressure transducer (used to control the power exhaust fans and the building pressure) is above 22 mA or below 2 mA then the alert will occur. If the alert occurs, then the economizer will be closed and the power exhaust fans turned off. This alert will automatically reset. Check the building pressure transducer and sensor tubing. The sensor is located in the auxiliary control box. The alert will automatically reset.

Alert Code 211 (Static Pressure Transducer Failure) — If the signal from the 4 to 20 mA static pressure transducer (used to control the VFD speed) is above 22 mA or below 2 mA then the alert will occur. This failure will cause the unit to stop due to the potential damage that could occur due to overpressurization. Check the pressure transducer and sensor tubing. The sensor is located in the auxiliary control box. The alert will automatically reset.

Alert Code 221 (Indoor Air Quality Sensor) — If the unit is configured to use demand ventilation and an IAQ sensor and the IAQ sensor input (IAQ) 4 to 20 mA reading is less than 2 mA or greater than 22 mA, then an alert will occur and the demand limiting option will be stopped. The OAQ 4 to 20 mA Sensor Config (OA.CF) must be configured for DCV or LOKOUT. The alert will automatically reset.

Alert Code 229 (Economizer Minimum Position Override Sensor Failure) — If the unit is configured to use the remote position override for the economizer and the input Econo Min. Pos. Override (E.MPO) input 4 to 20 mA reading is less than 2 mA or greater than 22 mA then an alert will occur and the default software minimum position will be used for the economizer. The alert will automatically reset.

Alert 300 (Space Temperature Below Limit) — If the space temperature is below the configurable SPT Low Alert Limits (occupied [SPL.O] or unoccupied [SPL.U]), then the unit will be stopped. The alert will automatically reset. The limits are configurable and are located in the CONFIGURATION-ALLM submenu.

Alert 301 (Space Temperature Above Limit) — If the space temperature is above the configurable SPT High Alert Limits (occupied [SPH.O] or unoccupied [SPH.U]), then the unit will be stopped if the conditions for the alert are met. The alert will automatically reset. The limits are configurable and are located in the CONFIGURATION-ALLM submenu.

Alert 302 (Supply Temperature Below Limit) — If the supply-air temperature measured by the EDT sensor is below the configurable SAT LO Alert Limit/Occ (SAL.O) or the Low Supply air temperature alert limit unoccupied mode (SAL.U), then cooling will be stopped but heating will continue. The limits are configurable and are located in the CONFIGURATION-ALLM submenu.

Alert 303 (Supply Temperature Above Limit) — If the supply temperature is above the configurable SAT HI Alert Limit Occ (SAH.O) or the SAT HI Alert Limit/Unocc (SAH.U), then heating will be stopped but cooling will continue. The alert will automatically reset. The limits are configurable and are located in the CONFIGURATION-ALLM submenu.

Alert 304 (Return Air Temperature Below Limit) — If the return air temperature measured by the RAT sensor is below the configurable RAT LO Alert Limit/Occ (RAL.O) or RAT HI Alert Limit/Occ (RAL.U), then the alert will occur and internal routines will be modified. The unit will continue to run but VAV heating will be disabled. The limits are configurable and are located in the CONFIGURATION-ALLM submenu.

Alert 305 (Return Air Temperature Above Limit) — If the return air temperature is below the RAT HI Alert Limit/Occ (RAH.O) OR RAT HI Alert Limit/Occ (RAH.U), then the unit will continue to run but the alert will be indicated.

The alert will automatically reset. The limits are configurable and are located in the CONFIGURATION-ALLM submenu.

Alert Code 308 (Return Air Relative Humidity Below Limit) — If the unit is configured to use a return air relative humidity sensor through the Return Air RH Sensor (RRHS) setting, and the measured level is below the configurable RH Low Alert Limit (IRH.L), then the alert will occur. The unit will continue to run and the alert will automatically reset. The limits can be set in the CONFIGURATION-ALLM submenu.

Alert Code 309 (Return Air Relative Humidity Above Limit) — If the unit is configured to use a return air relative humidity sensor through the Return Air RH Sensor (RRHS) setting, and the measure level is above the configurable RH High Alert Limit (IRH.H), then the alert will occur. Unit will continue to run and the alert will automatically reset. The limits can be set in the CONFIGURATION-ALLM submenu.

Alert Code 310 (Supply Duct Pressure Below Limit) — If the unit is a VAV unit with a supply duct pressure sensor and the measure supply duct static pressure (DUCT) is below the configurable SP Low Alert Limit (DP.L), then the alert will occur. The unit will continue to run and the alert will automatically reset. The limits can be set in the CONFIGURATION-ALLM submenu.

Alert Code 311 (Supply Duct Pressure Above Limit) — If the unit is a VAV unit with a supply duct pressure sensor and the measured supply duct static pressure (DUCT) is above the configurable SP Low Alert Limit (DP.H), then the alert will occur. The unit will continue to run and the alert will automatically reset. The limits can be set in the CONFIGURATION-ALLM submenu.

Alert Code 312 (Building Static Pressure Below Limit) — If the unit is configured to use modulating power exhaust then a building static pressure limit can be configured in the CONFIGURATION-ALLM submenu using the BP Low Alert Limit (BP.L). If the measured pressure is below the limit then the alert will occur.

Alert Code 313 (Building Static Pressure Above Limit) — If the unit is configured to use modulating power exhaust then a building static pressure limit can be configured in the CONFIGURATION-ALLM submenu using the BP HI Alert Limit (BP.H). If the measured pressure is above the limit, then the alert will occur. The limits can be set in the CONFIGURATION-ALLM submenu.

Alert Code 314 (IAQ Above Limit) — If the unit is configured to use an CO_2 sensor and the level is above the configurable IAQ High Alert Limit (IQ.HI) then the alert will occur. The unit will continue to run and the alert will automatically reset. The limits can be set in the CONFIGURATION-ALLM submenu.

Alarm Code 404 (Fire Shutdown) — This alarm occurs when the fire shutdown input is active (either open or closed depending upon its configuration). This alarm is usually caused by an auxiliary device that is trying to shut down the unit (e.g., smoke detector). The configuration for this switch input can be found at variable FS.SW. Verify that the configuration is set correct, verify the wiring and auxiliary device. This alarm resets automatically.

Alarm Code 405 (Evacuation Emergency Mode) — Unit has been placed in the fire evacuation mode by means of the external command for evacuation (F.EVC).

Alarm Code 406 (Pressurization Emergency Mode) — Unit has been placed in the fire pressurization mode by means of the External command for pressurization (F.PRS).

Alarm Code 407 (Purge Emergency Mode) — Unit has been placed in the fire pressurization mode by means of the External command for pressurization (F.PRS).

Alert Code 408 (Dirty Air Filter) — This alert occurs when the Filter Status switch senses a plugged filter for 120 continuous seconds after the indoor fan has been running for 10 seconds. Because the Dirty Air Filter switch can be configured normally opened or closed, the switch might be open or closed. The configuration for this switch input can be found at variable FL.SW. Verify that the configuration is set correctly. Verify the wiring and filter status switch. The hose should be connected to the low side of the switch. This alert resets automatically.

Alert Code 409 (Fan Status Switch On, Fan Contactor Off) — When the unit is equipped with a fan status switch and the fan status switch has sensed that the indoor fan has been on for 10 seconds and the indoor fan feedback has determined that the indoor fan should be off an alert will occur. Because the Fan Status switch can be configured normally opened or closed, the switch might be open or closed. The configuration for this switch input can be found in CONFIGURATION-UNIT submenu — Fan Status Monitoring Type (IF.M). Verify that the configuration is set correctly. Verify the wiring and fan status switch. The hose should be connected to the high side of the switch. If the IDF is configured to shut down the unit when this alarm occurs (Scrolling Marquee: CONFIGURATION-UNIT submenu, IS.FS = YES), then this alarm can only be reset manually and the unit will be shut down. If the IS.FS is not configured to shut the unit down when this alarm occurs, then this alarm resets automatically and no specific control action is taken.

Alert Code 409 (Fan Status Switch Off, Fan Contactor On) — This alert occurs can occur in two ways. The first is when the unit is configured with a fan status switch and the fan status switch has sensed that the indoor fan has been off for 10 seconds and the indoor fan feedback has determined that the indoor fan should be on. Because the Fan Status switch can be configured normally opened or closed, the switch might be open or closed. The configuration for this switch input can be found in CONFIGURATION-UNIT submenu — Fan Status Monitoring Type (IF.M). Verify that the configuration is set correctly. Verify the wiring and fan status switch. The hose should be connected to the high side of the switch. If the IDF is configured to shut down the unit when this alarm occurs (Scrolling Marquee: CONFIGURATION-UNIT submenu, IS.FS = YES), then the alert resets automatically and no specific control action is taken.

A second method can occur on VAV systems with a supply duct pressure sensor. If Fan Status Monitoring Type (IF.M) is set for Delta Press monitoring then the controls will monitor the pressure and trip the alarm below a pressure of 0.2 in. wg.

Alert Code 409 (Fan Feedback On When Not Expected) — This alert occurs when the Fan Feedback signal has been On for more than 5 seconds yet the Fan Power relay is Off. Verify wiring.

Alert Code 409 (Fan Feedback Off When Not Expected) — This alert occurs when the IDF has been on for more than 15 seconds yet the Fan Feedback is Off. Verify wiring. Compressors will not be allowed to run until this alert clears.

Alert Code 414 (Loss of Communication with Belimo Actuator) — The Belimo economizer motor is a digital controlled motor. The *Comfort*Link™ control can monitor the status of the motor. If there is a problem, this alert will occur. The control will attempt to close the economizer dampers.

Alert Code 414 (Belimo Actuator Direction Error) — This alert occurs when the economizer damper direction switch is in the wrong position. The direction switch should be in the clockwise position and the actuator should be mounted so that the CW face of the actuator is accessible. Correct if necessary. This alert clears automatically.

Alert Code 414 (Belimo Actuator Failure) — This alert occurs when the commanded damper position is changing too rapidly. This alert resets automatically.

Alert Code 414 (Belimo Actuator Hunting Alert) — This alert occurs when there is excess movement of the economizer motor. Check the mechanical actuation of the dampers.

.Alert Code 414 (Belimo Actuator Jammed) — This alarm occurs when the actuator senses it can no longer move. Investigate what is stopping the rotation of the actuator and fix. This alert resets automatically.

Alert Code 414 (Belimo Actuator Range Error) — This alert occurs when the economizer range of motion is less than 90 degrees. Initiate economizer calibration (E.CAL) using the Service Test menu.

Alert Code 414 (Belimo Actuator Torque error) — This alert occurs when the actuator load is too high. Investigate to determine what is increasing damper load. This alert resets automatically.

Alert Code 420 (R-W1 Jumper Not Installed in Space Temp Mode) — This alert occurs when the control mode is Space Temperature Mode via Auto Select or Space Temp Select yet there is no power to W1. Verify that space temperature mode is the desired mode or add jumper between R and W1. This alert resets automatically.

Alert Code 420 (R-W1 Jumper Must be Installed to Run Heat in Service Test) — This alert occurs when a request for a heat output has occurred yet the W1 input is not high. A jumper must be installed between R and W1 when trying to test heat in Service Test. The alert will clear when Service Test is exited or if another Service Test mode is selected. Remove jumper when done using Service Test if the unit is operating with a thermostat. The jumper should only be left in place if the unit is operating with a Space Temperature sensor.

Alert Code 421 (Y2 without Y1) — This alert occurs in Thermostat Mode when Y2 is energized and Y1 is not. Verify thermostat and thermostat wiring. When Y2 turns on, the software will behave as if Y1 and Y2 are both on. When Y2 turns off, the software will behave as if Y1 and Y2 are both Off. This alert resets automatically when Y1 is turned on.

Alert Code 422 (W2 without W1) — This alert occurs in Thermostat Mode when W2 is energized and W1 is not. Verify thermostat and thermostat wiring. When W2 turns on, the software will behave as if W1 and W2 are both on. When W2 turns off, the software will behave as if W1 and W2 are both off. This alert resets automatically when W1 is turned on.

Alert Code 423 (Y and W Simultaneously) — This alert occurs in Thermostat Mode when Y1 or Y2 is energized simultaneously with W1 or W2. Verify thermostat and thermostat wiring. The software will enter either the cooling or heating mode depending upon which input turned on first. This alert resets automatically when Y1 and Y2 are not on simultaneously with W1 and W2.

Alert Codes 500, 501, 502, 503 (Current Sensor Failure) — Alert codes 500, 501, 502, and 503 are for compressors A1, A2, B1, and B2 respectively. These alerts occur when the output of the current sensor (CS) is a constant high value. These alerts reset automatically. The cause of the alert is a wiring error or a loose connection. If the problem cannot be resolved and the CS board must be replaced, the CS board can be temporarily disabled while securing a replaced board. A CS board is disabled by setting the corresponding configuration to DISABLE (CS.A1, CS.A2, CS.B1 or CS.B2).

Alert Code 700 (Supply Air Temperature Sensor Failure) — If the EDT sensor has been relocated after the heating section then this alert will indicate a failure of this sensor. This alarm

occurs when the Supply Air temperature sensor (SAT) is outside the range –40 to 240 F (–40 to 116 C). This alert resets automatically. The cause of the alarm is usually a faulty thermistor, a shorted or open thermistor caused by a wiring error, or a loose connection.

Alert and Alarm Codes 701, 702, 703, 704 (Supply air Temperature Thermistor Failure) — Alerts 701, 702, and 703 are for failures of the staged gas heat supply air sensors 1, 2, and 3. Alarm 704 is an Alarm of all 3 sensors have failed. This alarm occurs when the sensor(s) are outside the range –40 to 240 F (–40 to 116 C). This alert resets automatically. When in alert staged gas heat will be stopped.

QUICK SETUP

The following section will provide a quick user guide to setting up and configuring the A series units with *Comfort*Link™ controls.

Two-Stage Constant Volume Units with Mechanical Thermostat — To configure the unit, perform the following:

1. The type of control is configured under the CONFIGURATION-UNIT submenu. Set CTL.T to 3 (TSTAT MULTI) or 4 (TSTAT 2 STAGE). Carrier recommends that TSTAT MULTI be used as the unit will have more than 2 stages of cooling capacity.
2. Remove jumpers from R-W2 and W2-W1.
3. See Economizer Options section on page 87 for additional economizer option configurations.
4. See Exhaust Options section on page 87 for additional exhaust option configurations.

Two-Stage Constant Volume Units with Space Sensor — To configure the unit, perform the following:

1. The type of control is configured under CONFIGURATION-UNIT submenu. Set CTL.T to 5 (SPT MULTI) or 6 (SPT 2 STAGE). Carrier recommends that SPT MULTI be used as the unit will have more stages of capacity that with SPT 2 STAGE.
2. Under CONFIGURATION-OPTS submenu, enable the space sensor by setting SPT.S to enable.
3. The space temperature set points are configured under the SETPOINTS menu. The heating and cooling set points must be configured. See the General Heating and Cooling Control section for further description on these configurations. Configure the following set points:

OHSP	Occupied Heat Set Point
OCSP	Occupied Cool Set Point
UHSP	Unoccupied Heat Set Point
UCSP	Unoccupied Cool Set Point
GAP	Heat-Cool Set Point Gap

4. The degrees of demand from the space temperature set points are configured under the CONFIGURATION-CMF.D Submenu. See the General Heating and Cooling Run Control section for further description on these configurations. Configure the following set points:

LH.ON	Demand Level Lo Heat On
HH.ON	Demand Level Hi Heat On
LH.OF	Demand Level Lo Heat Off
LC.ON	Demand Level Lo Cool On
HC.ON	Demand Level Hi Cool On
LC.OF	Demand Level Lo Cool Off
CT.LV	Cool Trend Demand Level
HT.LV	Heat Trend Demand Level
CT.TM	Cool Trend Time
HT.TM	Heat Trend Time

5. Ensure jumpers are installed between R-W2 and W2-W1.
6. Under the CONFIGURATION-UNIT submenu, set FAN.M to 1 for continuous fan or 0 for automatic fan. Most building codes now require continuous fan for ventilation.
7. To program local time schedules, set SCH.N=1 under the TIMECLOCK menu to configure the control to use local schedules.
8. Under the TIMECLOCK-SCH.L submenu, enter the desired schedule. See Table 20 for further descriptions of these configurations.
9. Under the TIMECLOCK menu, the following schedules and overrides should be configured:

OTL	Override time limit
OVR.S	SPT override enabled?
OVR.T	T58 override enabled?

10. See Economizer Options section on page 87 for additional economizer option configurations.
11. See Exhaust Options section on page 87 for additional exhaust option configurations.

Variable Air Volume Units Using Return Air Sensor — To configure the unit, perform the following:

1. The type of control is configured under the CONFIGURATION-UNIT submenu. Set CTL.T to 1 (VAV-RAT).
2. The space temperature set points and the supply air set points are configured under the SETPOINTS menu. The heating and cooling set points must be configured. See the General Heating and Cooling Run Control section for further description on these configurations. Configure the following set points:

OHSP	Occupied Heat Set Point
OCSP	Occupied Cool Set Point
UHSP	Unoccupied Heat Set Point
UCSP	Unoccupied Cool Set Point
GAP	Heat-Cool Set Point Gap
SA.SP	Supply Air Set Point
SA.HT	Heating Supply Air Set Point
V.C.ON	VAV Occupied Cool On Set Point
V.C.OF	VAV Occupied Cool Off Delta

3. To program time schedules, set SCH.N=1 under the TIMECLOCK menu to configure the control to use local schedules.
4. Under the TIMECLOCK-SCH.L submenu, enter the desired schedule or schedules. See Table 20 for further descriptions of these configurations.
5. Under the SETPOINTS menu, the Supply Duct Static (SP.SP) set point should be configured.
6. If Supply Air Reset is desired, under the CONFIGURATION-RST submenu, the following set points should be configured:

RST.T	Supply Air Reset Configuration
RTIO	Reset Ratio
R.LIM	Reset Limit

7. See the Economizer Options section on page 87 for additional economizer option configurations.
8. See the Exhaust Options section on page 87 for additional exhaust option configurations.

Variable Air Volume Units Using Space Temperature Sensor — To configure the unit, perform the following:

1. The type of control is configured under the CONFIGURATION-UNIT submenu. Set CTL.T to 2 (VAV-SPT).
2. Under the CONFIGURATION-OPTS submenu, enable the space sensor by setting SPT.S to enable.

3. The space temperature set points and the supply air set points are configured under the SETPOINTS menu. The heating and cooling set points must be configured. See the General Heating and Cooling Control section for further description on these configurations. Configure the following set points:

OHSP	Occupied Heat Set Point
OCSP	Occupied Cool Set Point
UHSP	Unoccupied Heat Set Point
UCSP	Unoccupied Cool Set Point
GAP	Heat-Cool Set Point Gap
SA.SP	Supply Air Set Point
SA.HT	Heating Supply Air Set Point
V.C.ON	VAV Occupied Cool On Set Point
V.C.OF	VAV Occupied Cool Off Delta

4. To program time schedules, set SCH.N=1 under the TIMECLOCK menu to configure the control to use local schedules.
5. Under the TIMECLOCK-SCH.L submenu, enter the desired schedule or schedules. See Table 20 for further descriptions of these configurations.
6. Under the TIMECLOCK menu, the following schedules and overrides should be configured:

OTL	Override time limit
OVR.S	SPT override enabled?
OVR.T	T58 override enabled?

7. Under the CONFIGURATION menu, the Supply Duct Static (SP.SP) set point should be configured.
8. If Supply air reset is desired, under the CONFIGURATION-RST submenu, the following set points should be configured:

RST.T	Supply Air Reset Configuration
RTIO	Reset Ratio
R.LIM	Reset Limit

9. See the Economizer Options section below for additional economizer option configurations.
10. See the Exhaust Options section below for additional exhaust option configurations.

Multi-Stage Constant Volume Units with Mechanical Thermostat — To configure the unit, perform the following:

1. Under the CONFIGURATION-UNIT submenu, set CTL.T to 3 (TSTAT MULTI).
2. Remove jumpers from R-W2 and W2-W1.
3. Under the SETPOINTS menu, set the following configurations:

HI.SA	Supply Air Set Point High
LO.SA	Supply Air Set Point Low

4. See the Economizer Options section below for additional economizer option configurations.
5. See the Exhaust Options section below for additional exhaust option configurations.

Multi-Stage Constant Volume Units with Space Sensor — To configure the unit, perform the following:

1. Under the CONFIGURATION-UNIT submenu, set CTL.T to 5 (SPT MULTI).
2. Under the CONFIGURATION-CMF.D submenu, the heating and cooling set points must be configured. Configure the following set points:

LH.ON	Demand Level Lo Heat On
HH.ON	Demand Level Hi Heat On
LH.OF	Demand Level Lo Heat Off
LC.ON	Demand Level Lo Cool On
HC.ON	Demand Level Hi Cool On
LC.OF	Demand Level Lo Cool Off
CT.LV	Cool Trend Demand Level
HT.LV	Heat Trend Demand Level
CT.TM	Cool Trend Time
HT.TM	Heat Trend Time

3. Ensure jumpers are installed between R-W2 and W2-W1.
4. Under the SETPOINTS menu, the following configurations should be set:

HI.SA	Supply Air Set Point High
LO.SA	Supply Air Set Point Low

5. Under the SETPOINTS submenu, the heating and cooling set points must be configured:

OHSP	Occupied Heat Set Point
OCSP	Occupied Cool Set Point
UHSP	Unoccupied Heat Set Point
UCSP	Unoccupied Cool Set Point
GAP	Heat-Cool Set Point Gap

6. Under the CONFIGURATION-OPTS submenu, enable the space sensor by setting SPT.S to enable.
7. Under the CONFIGURATION-UNIT submenu, set FAM.M to 1 for continuous fan or 0 for automatic fan.
8. To program time schedules, set SCH.N=1 under the TIMECLOCK menu to configure the control to use local schedules.
9. Under the TIMECLOCK-SCH.L submenu, enter the desired schedule or schedules. See Table 20 for further descriptions of these configurations.
10. See the Economizer Options section below for additional economizer option configurations.
11. See the Exhaust Options section below for additional exhaust option configurations.

Economizer Options — Under the CONFIGURATION-ECON submenu, the following set points should be configured:

EC.EQ	Economizer Installed
E.CGO	Economizer Changeover Select
MIN.P	Economizer Minimum Position
OAT.L	High OAT Lockout Temperature
OA.EC	Enthalpy Curve Select (only used for outdoor enthalpy changeover)
OA.DL	OA Dewpoint Limit (only when using outside air humidity sensor)
OEN.C	Outdoor Enthalpy Compare Value (only used with custom curve control)
EC.CB	Economizer Temperature Deadband

If the unit is going to be used with IAQ control then additional configurations will be required for the IAQ control. See the section on Demand Ventilation.

Exhaust Options — The following exhaust options should be configured.

TWO-STAGE EXHAUST OPTION — For two-stage exhaust, under the CONFIGURATION-ECON submenu, configure the following:

PWRX	Power Exhaust option should be set to 1
PWRM	Power Exhaust motors should be set to 1 (4 motors) for the 020-050 units and 2 (6 motors) for the 060 unit
PE1.P	Power Exhaust On 1 Set Point
PE2.P	Power Exhaust On 2 Set Point

MODULATING EXHAUST OPTION — For modulating exhaust, the unit must have the ECB2 and the building pressure sensor installed. To configure, set the following variables in the CONFIGURATION-ECON submenu:

PWRX	Power Exhaust option should be set to 1

PWRM	Power Exhaust motors should be set to 1 (4 motors) for the 020-050 units and 2 (6 motors) for the 060 unit

In the CONFIGURATION-BP submenu set the following variables:

BP.SL	Modulating PE Alg Select to 2
BP.S	Building Pressure sensor to enable
BP.R	Building pressure sensor range to 0.25
BP.HP	High BP level to desired value
BP.LP	Low BP level to the desired value

OPERATION

The control system has many options and accessories as well configurable control options. Actual unit operation will depend on the selected options and set points, but the following is a general sequence of operation for the basic types of systems.

Cooling, Constant Volume (CV) Units — On power up, the control module will activate the initialization software. The initialization software will determine the unit configuration and also initialize any controls loops and input/output devices. All configuration settings are maintained in memory during power outages. All alarms are be maintained in memory and must be cleared through the Scrolling Marquee display.

CONSTANT VOLUME CONVENTIONAL THERMOSTAT CONTROL — If the unit is equipped with a conventional thermostat (with Y1, Y2, W1, W2 and G connections) then the control will perform the following sequence.

When G is closed, the indoor fan will turn on. The G connection must be closed for heating or cooling to occur. If the unit is in the occupied mode then the economizer dampers will be opened to the minimum economizer position. If the unit is in the unoccupied mode then the economizer dampers will remain fully closed.

If Y1 is closed, then the control will first check the ability to use the economizer. If the economizer can be used, based on the selected changeover configuration, then the control will modulate the damper open to maintain the low load economizer leaving air temperature set point. If Y2 closes then the control will lower the leaving air temperature set point to the configured high load set point. If the economizer cannot satisfy the load, then compressors will be sequenced on to maintain either the low or high load temperature set points. If the economizer cannot be used or the enable control disables the economizer, then the control will sequence the compressors based on the Y1, Y2 signals. If two-stage control has been selected, then the control will map the compressors to the Y1, Y2 inputs as defined in the loading sequence. If multistage control has been selected, then the control will add and remove compressors stages to maintain the high and low demand set points. If Y1 is closed, at least one compressor stage will be turned on.

If W1 closes, then it will indicate that the unit should be in the heating mode. If the unit is equipped with gas or electric heat then the first stage of heat will be energized. If W2 closes, then the control will turn on the second stage of heat. If the unit is equipped with a staged gas heat control option, then the W1 and W2 signal will be used to control the gas heat to the configurable high and low heat load leaving air temperature set points. If the unit is equipped with gas heat, then the IGC board will control the operation of the gas heat. See the section on the IGC board sequence of operation.

CONSTANT VOLUME SPACE SENSOR CONTROL — If the space temperature operation has been selected by using a T55, T56, or T58 sensor, then following logic will be used to control the operation of the unit. If a space temperature sensor is used, then a wire jumper must be added between R, W1, and W2 for the heat to operate.

If a remote switch option is being used and configured for start/stop, then the switch must be closed for the unit to operate. If the remote switch option has been configured for occupancy, then the switch will be used to control occupied and unoccupied mode. In the unoccupied mode, the economizer damper will be positioned to zero unless free cooling is being used. In the occupied mode, the damper will open to the minimum position unless IAQ control is in also being used and then might be controlled to a lower position. When in the unoccupied mode, the type of cooling can be configured. If the internal timeclock function is being used, the start/stop function and occupied and unoccupied control will be established by the schedules that have been selected.

There are also some special pre-occupancy modes that may be used. If Temperature Compensated Start is active, the unit will be controlled as in the occupied mode and will start at a time (as determined by prior operation) to have the space at set point by the occupied time. If the unit has been configured for a pre-occupancy purge, then the control will start the unit in vent mode prior to the occupancy time to vent the space. If an IAQ sensor is being used and the low IAQ set point is satisfied then the occupancy purge mode will be terminated.

When using the space sensor control option, the set points for heating and cooling are configurable through the Scrolling Marquee display. If a T56 sensor is being used, then the set point can be shifted by as much as 10 degrees. If the space temperature goes above the cooling set point, then the unit will go into cooling mode. If the economizer can be used, then the control will first try to control to the leaving air temperature set point. The leaving air set point will depend on the space temperature. If the temperature is above the low demand set point then the low economizer load discharge air temperature set point will be used. If the temperature is above the high load space temperature set point then the high load leaving air temperature set point will be used. If the economizer cannot satisfy the load, then compressors will be sequenced on to maintain either the low or high load temperature set points. If the economizer cannot be used or the enable control disables the economizer, then the control will sequence the compressors based on the high and low load space temperature variables. If two stage control has been selected, then the control will map the compressors to the low and high loads as defined in the loading sequence. If adaptive mode has been selected, then the control will add and remove compressors stages to maintain the high and low demand leaving air set points.

If the load goes below the heating space temperature set point, then it will indicate that the unit should be in the heating mode. The economizer will be closed to the minimum position and, if the unit is equipped with gas or electric heat, then the first stage of heat will be energized. If the space temperature goes below the high load space temperature set point, then the control will turn on the second stage of heat. If the unit is equipped with a staged gas heat control option, then the low load and high load demand signal will control the leaving air temperature set point and will turn on heating stages to maintain the leaving air temperature set points.

If the units is configured for unoccupied free cooling, mechanical cooling, or heating and the temperature goes beyond the unoccupied configuration set points then the control will turn on free cooling, mechanical cooling, or heat as need to return within the unoccupied set points. When in this mode, the economizer dampers will be maintained fully closed or to the minimum unoccupied ventilation set point.

Variable Air Volume Control — On power up, the control module will activate the initialization software. The initialization software will determine the unit configuration and also initialize any controls loops and input/output devices. All configuration settings are maintained in memory during power outages. All alarms will be maintained in memory and must be cleared through the Scrolling Marquee display.

The unit will first determine the mode of operation. If the unit has been configured for space temperature demand, then the control will determine (based on the configurable set points) if the unit should be in the heat mode, vent mode, or cooling mode. If the unit is configured for return air temperature control, then it will start the fan and monitor the return air temperature against the configurable set point to determine if the unit should be in cooling, venting, or heating mode.

If the control is connected to a ComfortID™ system, the room terminals are equipped with microprocessor controls that give commands to the base module. If linkage is active then control module will replace local *Comfort*Link™ set points and occupancy data with linkage supplied data.

If temperature compensated start is active then the control will bring on the unit in advance to pre-cool or pre-heat the space. If the unit is configured to use a pre-purge cycle then the control will start the unit in vent mode based on a pre-start time interval. If an IAQ sensor is being used and the low IAQ control point is satisfied then the mode will be terminated.

If cooling mode is required, then the *Comfort*Link control will control to the leaving air temperature set point. If an economizer is present and the changeover control allows the economizer to be used, then the control will first attempt to control to the leaving-air temperature using free cooling. If this cannot satisfy the load, then additional compressor stages will be turned on to maintain the leaving air temperature. When both compressors and economizers are being used, the control will use the economizer dampers to maintain better control of the leaving air and to prevent high compressor cycling. If the economizer cannot be used, then the economizer will be set to the minimum vent position. When using compressors, the leaving-air temperature will be used to sequence to compressors on and off using a PID control loop.

When operating in cooling, the control will also monitor the supply duct pressure and send a 4 to 20 mA signal to the factory-supplied VFD to control the speed of the fan and the delivered CFM. If the unit is on a Linkage system, the control also supports static pressure reset based on the needs of the zones.

If the space temperature sensor (SPT), return air temperature sensor (RAT), or linkage demand requires that the unit be in heating, then the control will energize the electric heat or gas heat (if present) to warm the space. In this mode, the control will energize the heat interlock relay which opens to the heating position. For linkage systems, the interlock relay connection is not required. Heating will continue until the mode selection sensor is satisfied.

Gas Heat Units (48A) — The gas heat units incorporate 2 (on sizes 020-050) or 3 (on size 060) separate systems to provide gas heat. Each system incorporates its own induced-draft motor, Integrated Gas Control (IGC) board, 2 stage gas valve, manifold, and safeties. On 2-stage gas heat control, the systems operate in parallel. For example, when there is a call for first stage heat, both induced-draft motors operate, both gas valves are energized, and both IGC boards initiate spark. On a staged gas heat option the individual gas stages will be controlled to provide up to 11 stages of gas heat capacity.

All of the gas heating control is performed through the IGC boards (located in the heating section). The MBB module on 2-stage units and the optional SCB board on staged gas heat units only initiate and terminate heating operation and monitor the status of the requirements for indoor fan operation. The fan will be controlled directly by the MBB board, but when configured for intermittent fan operation, the IGC IFO output will initiate indoor fan operation.

For units with 2 stage gas heat control, the MBB is powered by 24 VAC. When the thermostat or room sensor calls for heating as determined by the MBB, the MBB will close heating relays and send power to W on each of the IGC boards (2 on sizes 020-050 and 3 on size 060). An LED on the IGC board will be on during normal operation.

A check is made to ensure that the rollout switches and limit switches are closed and the induced-draft motors are not running. The induced-draft motors are then energized, and when speed is proven with the Hall Effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

When ignition occurs, the IGC board will continue to monitor the condition of the rollout and limit switches, the Hall Effect sensor, and the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized and the outdoor-air dampers will open to their minimum position. If for some reason the over temperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

If the unit is controlled through a room sensor, the indoor fan will be operating in the occupied mode and the outdoor-air dampers will be in the minimum position. If the unit is controlled with a room sensor in the unoccupied mode, the indoor fan will be energized through the IGC board with a 45-second delay and the outside-air dampers will move to the minimum unoccupied set point. When additional heat is required, the second stage MBB output relay closes and initiates power to the second stage of all main gas valves in all sections.

When the demand is satisfied, MBB heat output relays will open and the gas valves close interrupting the flow of gas to the main burners. If the call for stage 1 heat lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is configured for intermittent fan, then the indoor-fan motor will continue to operate for an additional 45 seconds then stop and the outdoor-air dampers will close. If the over-temperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

If the unit is equipped with the optional staged gas heat control option, then each board and each stage of capacity will be control separately to provide up to 11 stages of gas heat capacity as determine by the average leaving air temperature. The first two stages will be controlled by the MBB and the next 4 stages will be controlled by the SCB. By changing the combinations of the stages, up to 11 stages will be used.

CCN Network System — The A series units with the *Comfort*Link control can operate either in a stand-alone mode or they can be interfaced with the Carrier Comfort Network (CCN), Building Supervisor, or Service Tool. When being installed in network applications, the unit is connected to the CCN communications bus with field-installed cable.

Other equipment can also be installed on the CCN by fitting the equipment with a Comfort Controller Device. The Comfort Controller Device has a standard processor module (PSIO) but is field-programmed for use with other HVAC components. A typical configuration is shown in Fig. 20.

Heating, ventilation and air conditioning (HVAC) and other building equipment being controlled by *Comfort*Link™, PICs, or Comfort Controller Devices have the inherent ability to 'talk' on a common communications bus or network. The configuration of the communications bus with 2 or more *Comfort*Link, PICs, or Comfort Controller-controlled pieces of equipment is referred to as a Carrier Comfort Network (CCN) system. The CCN communications bus conveys commands, data, and alarms between all elements of the system. Any system element connected to the bus may communicate with any other system element, regardless of their physical locations. The communications bus consists of a field-supplied, shielded, 3-conductor cable connected in daisy-chain fashion. The PICs, Comfort Controllers, and other network devices (such as TELink) can be added at any time to the network.

The main human interface with the CCN system is the ComfortWORKS® software. The ComfortWORKS software is installed on an IBM PC compatible computer that allows it to connect to the communications bus and 'talk' directly with any equipment connected to the network. An operator working with ComfortWORKS software can command, monitor, configure, or modify any portion of the system. More than one computer with ComfortWORKS software can be used. The computer with ComfortWORKS software, in conjunction with optional network products, can generate a wide variety of managerial reports which reflect the operational characteristics of one or more buildings.

To take further advantage of the network, accessory or optional control options modules that perform specialized functions can be added to the communications bus at any time to enhance the CCN system's capabilities. Each control options module consists of a standard hardware module with special purpose algorithms and communications software that provide an advanced control function for the entire CCN system or a designated portion of the system. Data collection, remote communications, demand limiting, and tenant billing are a few examples of the network capabilities available to give the building owner increased system performance and superior building management capabilities.

Zoned systems meet the zone temperature control needs for many commercial applications. These systems utilize a microelectronic thermostat as a basis for individual zone control and typically build multiple-zone systems with constant volume (CV) or variable-air volume (VAV) units. Zoned systems can provide complete control of heating and cooling equipment and zone dampers in many types of HVAC (heating, ventilation and air conditioning) systems.

Digital Air Volume (DAV) Linkage — The A series Carrier rooftop units with *Comfort*Link may also have a communication linkage with the VAV terminal units in a particular application. This linkage is called the DAV linkage. In order for this linkage to be possible, the individual VAV air terminals must be equipped with Carrier PIC controls and the air terminals must be linked by a Terminal System Manager (TSM). The TSM acts as the communication link between the VAV air terminal PICs and the rooftop unit. When the TSM is fully programmed and begins communication, the rooftop control begins using information from the TSM for rooftop unit control operation. This is automatic, and does not require a configuration change to the standard rooftop unit controls.

START-UP

IMPORTANT: Do not attempt to start unit, even momentarily, until all items on the Start-Up Checklist (in installation instructions) and the following steps have been completed.

Unit Preparation — Check that unit has been installed in accordance with the installation instructions and applicable codes.

Unit Setup — Make sure that the economizer hood has been installed and that the outdoor filters are properly installed.

Internal Wiring — Ensure that all electrical connections in the control box are tightened as required. If the unit has staged gas heat make sure that the LAT sensors have been routed to the supply ducts as required.

Accessory Installation — Check to make sure that all accessories including space thermostats and sensors have been installed and wired as required by the instructions and unit wiring diagrams.

Crankcase Heaters — Crankcase heaters are energized as long as there is power to the unit, except when the compressors are running.

IMPORTANT: Unit power must be on for 24 hrs prior to start-up of compressors. Otherwise damage to compressors may result.

Evaporator Fan — Fan belt and fixed pulleys are factory-installed. See Tables 42-65 for fan performance and motor limitations data. Remove tape from fan pulley, and be sure that fans rotate in the proper direction. See Table 66 for motor limitations. See Table 67 for air quantity limits. Static pressure drop for power exhaust is negligible. To alter fan performance, see Evaporator Fan Performance Adjustment section on page 104.

Controls — Use the following steps for the controls:

1. Set any control configurations that are required (field-installed accessories, etc.). The unit is factory configured for all appropriate factory-installed options.
2. Enter unit set points. The unit is shipped with the set point default values. If a different set point is required use the Scroll Marquee, Navigator or Service Tool to change the configuration valves.
3. If the internal unit schedules are going to be used configure the Occupancy schedule.
4. Verify that the control time periods programmed meet current requirements.
5. Start unit using Service Test mode to verify operation of all major components.
6. If the unit is a VAV unit make sure to configure the VFD static pressure set point using the display. To checkout the VFD use the VFD instructions shipped with the unit.

Gas Heat — Verify gas pressure before turning on gas heat as follows:

1. Turn off field-supplied manual gas stop, located external to the unit.
2. Connect pressure gages to supply gas tap, located at field supplied manual shutoff valves.
3. Connect pressure gages to manifold pressure tap on unit gas valve.
4. Supply gas pressure must not exceed 13.5 in. wg. Check pressure at field-supplied shut-off valve.
5. Turn on manual gas stop and initiate a heating demand. Jumper R to W1 in the control box to initiate heat.
6. Use the Service Test procedure to verify heat operation.
7. After the unit has run for several minutes, verify that incoming pressure is 6.0 in. wg or greater and that the manifold pressure is 3.5 in wg. If manifold pressure must be adjusted refer to Gas Valve Adjustment section.

Table 42 — Fan Performance — 48AJ,AK020,025 Units

48AJ,AK020,025 (20 THRU 25 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	394	1.06	413	1.15	478	1.51	536	1.89	588	2.29	635	2.69	679	3.11	720	3.53	758	3.96	794	4.39
5,000	388	1.26	448	1.58	509	1.96	563	2.36	613	2.77	659	3.20	702	3.63	742	4.08	780	4.53	816	4.99
6,000	427	1.76	489	2.15	544	2.54	595	2.96	642	3.38	686	3.83	727	4.28	766	4.74	804	5.21	839	5.69
7,000	476	2.44	534	2.86	584	3.28	631	3.70	675	4.15	717	4.60	756	5.07	794	5.54	830	6.03	865	6.53
7,500	502	2.83	557	3.27	606	3.70	651	4.14	694	4.59	734	5.05	772	5.52	809	6.01	845	6.50	878	7.00
8,000	527	3.26	580	3.72	628	4.16	671	4.61	713	5.07	752	5.54	789	6.02	825	6.51	860	7.01	893	7.51
9,000	580	4.25	629	4.74	674	5.21	715	5.68	753	6.16	790	6.65	826	7.14	860	7.65	893	8.16	925	8.67
10,000	633	5.40	679	5.93	721	6.43	760	6.93	796	7.43	831	7.94	865	8.45	897	8.96	929	9.49	959	10.02
11,000	687	6.74	731	7.30	770	7.84	807	8.36	842	8.89	875	9.41	907	9.94	937	10.47	967	11.01	997	11.55
12,000	741	8.26	783	8.86	820	9.43	855	9.98	888	10.53	920	11.08	950	11.62	980	12.18	1008	12.73	1036	13.29
12,500	768	9.10	809	9.71	846	10.30	880	10.87	912	11.43	943	11.99	973	12.54	1002	13.10	1030	13.67	1057	14.23
13,000	796	9.98	835	10.62	871	11.22	905	11.80	936	12.38	966	12.95	996	13.51	1024	14.08	1051	14.65	1078	15.23

48AJ,AK020,025 (20 THRU 25 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	828	4.83	861	5.27	892	5.72	922	6.17	951	6.62	979	7.08	1006	7.54	1032	8.00	1058	8.47	1082	8.93
5,000	850	5.46	883	5.93	915	6.40	945	6.88	974	7.36	1002	7.85	1030	8.34	1056	8.83	1082	9.33	1107	9.82
6,000	873	6.18	906	6.67	937	7.17	967	7.67	997	8.18	1025	8.69	1052	9.20	1079	9.72	1105	10.24	1130	10.77
7,000	898	7.03	930	7.54	961	8.05	991	8.57	1020	9.10	1048	9.63	1075	10.16	1101	10.70	1127	11.25	1153	11.79
7,500	911	7.51	943	8.02	973	8.55	1003	9.08	1032	9.61	1060	10.15	1087	10.69	1113	11.24	1139	11.79	1164	12.35
8,000	925	8.03	956	8.55	986	9.08	1016	9.62	1044	10.16	1072	10.70	1099	11.26	1125	11.81	1150	12.37	1175	12.94
9,000	956	9.20	986	9.74	1015	10.28	1043	10.83	1071	11.38	1098	11.94	1124	12.50	1150	13.08	1175	13.65	1200	14.23
10,000	989	10.56	1018	11.10	1046	11.66	1073	12.21	1100	12.78	1126	13.35	1152	13.93	1177	14.51	—	—	—	—
11,000	1025	12.10	1053	12.66	1080	13.23	1106	13.80	1132	14.37	1158	14.95	1182	15.54	—	—	—	—	—	—
12,000	1063	13.85	1090	14.42	1116	15.00	1142	15.58	1166	16.17	1191	16.76	—	—	—	—	—	—	—	—
12,500	1083	14.80	1109	15.38	1135	15.96	1160	16.55	1185	17.14	—	—	—	—	—	—	—	—	—	—
13,000	1104	15.81	1129	16.39	1155	16.98	1179	17.57	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 93.

Table 43 — Fan Performance — 48AJ,AK027,030 Units

48AJ,AK027,030 (27 THRU 30 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	408	1.50	473	1.88	530	2.27	582	2.67	631	3.10	675	3.53	717	3.98	757	4.43	795	4.89	830	5.36
6,000	433	1.80	495	2.18	549	2.58	600	3.00	646	3.43	690	3.87	731	4.32	770	4.79	807	5.26	843	5.74
7,000	484	2.49	540	2.91	591	3.33	637	3.76	681	4.21	722	4.66	761	5.13	799	5.61	835	6.09	869	6.59
8,000	537	3.34	589	3.79	635	4.23	678	4.69	719	5.15	758	5.62	795	6.10	831	6.59	865	7.09	898	7.60
8,250	550	3.57	601	4.03	647	4.49	689	4.94	729	5.41	768	5.88	804	6.37	840	6.86	874	7.37	906	7.88
9,000	590	4.35	638	4.83	682	5.31	723	5.78	761	6.26	798	6.75	833	7.24	867	7.75	899	8.26	931	8.78
10,000	645	5.53	690	6.05	731	6.56	769	7.05	805	7.55	840	8.06	873	8.57	905	9.09	936	9.61	967	10.15
11,000	700	6.90	742	7.46	781	7.99	817	8.51	851	9.04	884	9.56	916	10.09	946	10.62	976	11.16	1005	11.71
12,000	755	8.46	795	9.05	832	9.61	866	10.17	899	10.71	930	11.26	960	11.81	989	12.36	1018	12.91	1045	13.47
13,000	811	10.23	849	10.85	884	11.44	917	12.02	948	12.59	978	13.16	1006	13.73	1034	14.30	1061	14.87	1088	15.45
13,750	854	11.69	890	12.33	924	12.95	955	13.55	985	14.14	1014	14.72	1042	15.31	1069	15.89	1095	16.48	1121	17.07
14,000	868	12.20	904	12.86	937	13.48	968	14.08	998	14.68	1026	15.27	1054	15.86	1081	16.45	1107	17.05	1132	17.64
15,000	924	14.40	959	15.08	990	15.73	1020	16.37	1049	16.99	1076	17.61	1103	18.22	1128	18.83	1153	19.44	1178	20.05

48AJ,AK027,030 (27 THRU 30 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	864	5.84	897	6.32	928	6.81	959	7.30	988	7.80	1016	8.30	1043	8.80	1070	9.31	1096	9.82	1121	10.33
6,000	876	6.23	909	6.72	940	7.22	970	7.72	999	8.23	1028	8.74	1055	9.25	1081	9.77	1107	10.29	1132	10.82
7,000	902	7.09	934	7.60	965	8.12	994	8.64	1023	9.17	1051	9.70	1078	10.23	1105	10.77	1131	11.32	1156	11.86
8,000	930	8.12	961	8.64	991	9.17	1020	9.71	1049	10.25	1076	10.80	1103	11.35	1129	11.90	1155	12.47	1180	13.03
8,250	938	8.40	969	8.92	998	9.46	1027	10.00	1055	10.54	1083	11.09	1109	11.65	1135	12.21	1161	12.78	1186	13.34
9,000	962	9.31	992	9.84	1021	10.39	1049	10.94	1076	11.49	1103	12.05	1130	12.62	1155	13.19	1180	13.76	—	—
10,000	996	10.69	1025	11.24	1053	11.79	1080	12.35	1107	12.92	1133	13.49	1158	14.07	1183	14.65	—	—	—	—
11,000	1033	12.26	1060	12.82	1087	13.39	1114	13.96	1139	14.54	1165	15.12	1189	15.71	—	—	—	—	—	—
12,000	1072	14.04	1099	14.61	1125	15.19	1150	15.77	1175	16.36	1199	16.96	—	—	—	—	—	—	—	—
13,000	1114	16.03	1139	16.62	1164	17.21	1188	17.80	—	—	—	—	—	—	—	—	—	—	—	—
13,750	1146	17.66	1171	18.26	1195	18.86	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14,000	1157	18.23	1181	18.84	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 93.

Table 44 — Fan Performance — 48AJ,AK035 Units

48AJ,AK035 (35 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	549	2.97	598	3.40	644	3.83	687	4.28	728	4.73	767	5.20	805	5.68	840	6.17	874	6.67	907	7.17
8,000	606	3.95	651	4.40	694	4.85	734	5.32	772	5.79	808	6.28	844	6.77	878	7.27	910	7.79	942	8.31
9,000	664	5.11	706	5.58	745	6.06	783	6.55	818	7.04	853	7.54	886	8.05	918	8.56	949	9.09	979	9.62
10,000	723	6.46	762	6.96	799	7.46	833	7.97	867	8.48	899	8.99	931	9.52	961	10.05	991	10.59	1019	11.13
10,500	753	7.22	790	7.73	826	8.24	859	8.75	892	9.27	923	9.80	954	10.33	983	10.87	1012	11.42	1040	11.97
11,000	783	8.02	819	8.55	853	9.07	886	9.59	917	10.12	948	10.66	978	11.20	1006	11.74	1035	12.30	1062	12.86
12,000	843	9.79	877	10.34	909	10.88	940	11.43	969	11.98	998	12.53	1026	13.09	1054	13.65	1081	14.22	1107	14.79
13,000	903	11.78	935	12.35	965	12.92	994	13.49	1023	14.06	1050	14.63	1077	15.21	1103	15.79	1128	16.37	1154	16.96
14,000	964	14.00	994	14.60	1022	15.19	1050	15.78	1077	16.37	1103	16.96	1129	17.56	1153	18.15	1178	18.75	1202	19.35
15,000	1025	16.46	1053	17.08	1080	17.70	1106	18.31	1132	18.92	1157	19.53	1181	20.14	1205	20.76	1229	21.37	1251	21.99
16,000	1086	19.17	1112	19.81	1138	20.45	1163	21.08	1188	21.71	1212	22.35	1235	22.98	1258	23.61	1280	24.24	—	—
17,000	1147	22.13	1172	22.80	1197	23.45	1221	24.11	1244	24.76	1267	25.41	1290	26.06	—	—	—	—	—	—
17,500	1177	23.71	1202	24.39	1226	25.06	1250	25.72	1273	26.39	1295	27.04	—	—	—	—	—	—	—	—

48AJ,AK035 (35 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	939	7.68	969	8.20	999	8.72	1028	9.25	1056	9.78	1083	10.32	1109	10.86	1135	11.40	1160	11.95	1184	12.50
8,000	972	8.83	1002	9.36	1031	9.90	1059	10.45	1086	11.00	1113	11.55	1139	12.11	1164	12.67	1188	13.24	1213	13.81
9,000	1009	10.16	1037	10.71	1065	11.26	1092	11.82	1119	12.38	1145	12.95	1170	13.53	1195	14.11	1219	14.69	1243	15.27
10,000	1048	11.69	1075	12.25	1102	12.81	1128	13.38	1154	13.96	1179	14.54	1203	15.13	1227	15.72	1251	16.32	1274	16.92
10,500	1068	12.53	1095	13.09	1121	13.66	1147	14.24	1172	14.83	1197	15.41	1221	16.01	1245	16.61	1268	17.21	1291	17.82
11,000	1089	13.42	1115	13.99	1141	14.57	1166	15.15	1191	15.74	1215	16.34	1239	16.94	1262	17.54	1285	18.15	—	—
12,000	1133	15.37	1158	15.96	1182	16.55	1207	17.14	1230	17.75	1254	18.35	1277	18.96	1299	19.58	—	—	—	—
13,000	1178	17.55	1202	18.15	1226	18.75	1249	19.36	1272	19.97	1295	20.59	—	—	—	—	—	—	—	—
14,000	1225	19.96	1248	20.57	1271	21.19	1294	21.81	—	—	—	—	—	—	—	—	—	—	—	—
15,000	1274	22.61	1296	23.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 93.

Table 45 — Fan Performance — 48AJ,AK040 Units

48AJ,AK040 (40 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	502	2.90	550	3.30	596	3.71	639	4.12	680	4.54	720	4.97	759	5.40	796	5.85	832	6.31	867	6.77
9,000	552	3.81	595	4.24	637	4.67	677	5.11	715	5.55	752	6.00	788	6.45	823	6.92	857	7.39	890	7.87
10,000	602	4.89	642	5.34	680	5.80	717	6.26	752	6.73	787	7.20	821	7.67	854	8.16	886	8.64	917	9.14
11,000	653	6.15	689	6.62	725	7.11	759	7.59	792	8.08	825	8.58	856	9.07	887	9.57	918	10.08	947	10.59
12,000	704	7.60	738	8.09	771	8.60	803	9.11	834	9.63	865	10.14	895	10.66	924	11.18	952	11.71	980	12.24
13,000	756	9.24	788	9.76	818	10.29	848	10.83	878	11.36	906	11.90	935	12.44	962	12.99	989	13.53	1016	14.08
14,000	808	11.10	838	11.64	867	12.19	895	12.74	922	13.30	950	13.87	976	14.43	1002	15.00	1028	15.57	1053	16.14
15,000	861	13.18	888	13.74	915	14.31	942	14.88	968	15.46	994	16.05	1019	16.63	1044	17.22	1068	17.81	1093	18.40
16,000	914	15.49	940	16.06	965	16.65	990	17.24	1015	17.85	1039	18.45	1063	19.06	1087	19.67	1110	20.28	1133	20.89
17,000	967	18.03	991	18.62	1015	19.23	1039	19.85	1062	20.47	1086	21.09	1109	21.72	1131	22.35	1153	22.98	1175	23.61
18,000	1020	20.82	1043	21.43	1066	22.06	1088	22.69	1111	23.33	1133	23.97	1155	24.62	1176	25.27	1197	25.92	1219	26.58
19,000	1073	23.87	1095	24.50	1117	25.14	1138	25.79	1159	26.44	1180	27.11	1201	27.77	1222	28.45	1242	29.12	—	—
20,000	1127	27.18	1147	27.82	1168	28.48	1188	29.15	—	—	—	—	—	—	—	—	—	—	—	—

48AJ,AK040 (40 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	901	7.24	933	7.72	965	8.20	995	8.69	1024	9.19	1053	9.69	1081	10.19	1108	10.70	1134	11.21	1159	11.73
9,000	923	8.35	954	8.85	985	9.35	1014	9.86	1043	10.37	1072	10.89	1099	11.41	1126	11.94	1152	12.47	1177	13.00
10,000	948	9.64	978	10.15	1007	10.66	1036	11.19	1064	11.71	1092	12.25	1119	12.78	1145	13.33	1171	13.88	1196	14.43
11,000	976	11.11	1005	11.63	1033	12.16	1061	12.70	1088	13.24	1114	13.79	1140	14.34	1166	14.90	1191	15.46	1216	16.03
12,000	1008	12.77	1035	13.31	1062	13.86	1088	14.41	1114	14.97	1139	15.53	1164	16.09	1189	16.67	1213	17.24	1237	17.83
13,000	1042	14.64	1068	15.19	1093	15.76	1118	16.32	1143	16.89	1167	17.47	1191	18.05	1215	18.64	1238	19.23	1262	19.82
14,000	1078	16.71	1103	17.28	1127	17.86	1151	18.45	1174	19.03	1198	19.63	1221	20.22	1244	20.82	1266	21.43	1288	22.04
15,000	1116	19.00	1140	19.59	1163	20.19	1186	20.79	1208	21.40	1230	22.00	1253	22.62	1274	23.23	1296	23.85	—	—
16,000	1156	21.51	1178	22.12	1200	22.74	1222	23.36	1244	23.98	1265	24.61	1286	25.24	—	—	—	—	—	—
17,000	1197	24.25	1218	24.89	1240	25.52	1261	26.17	1281	26.81	—	—	—	—	—	—	—	—	—	—
18,000	1239	27.24	1260	27.89	1280	28.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 93.

Table 46 — Fan Performance — 48AJ,AK050 Units

48AJ,AK050 (50 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	512	2.98	560	3.38	604	3.79	647	4.20	688	4.62	728	5.05	766	5.49	803	5.94	839	6.40	874	6.86
9,000	561	3.90	604	4.33	645	4.77	685	5.20	723	5.65	760	6.10	796	6.55	831	7.02	864	7.49	897	7.97
10,000	611	5.00	651	5.45	689	5.91	725	6.37	761	6.84	795	7.31	829	7.79	861	8.27	893	8.76	925	9.26
11,000	662	6.27	699	6.75	734	7.23	768	7.72	801	8.21	833	8.71	865	9.20	895	9.71	925	10.21	955	10.73
12,000	714	7.74	748	8.24	780	8.75	812	9.26	843	9.77	873	10.29	903	10.81	932	11.33	960	11.86	988	12.39
13,000	766	9.41	798	9.93	828	10.46	858	11.00	887	11.54	916	12.08	944	12.62	971	13.16	998	13.71	1024	14.26
14,000	819	11.29	848	11.84	877	12.39	905	12.95	932	13.51	959	14.07	986	14.63	1012	15.20	1037	15.77	1062	16.34
15,000	872	13.40	899	13.96	926	14.54	953	15.11	979	15.70	1004	16.28	1029	16.87	1054	17.46	1078	18.05	1102	18.64
16,000	925	15.74	951	16.32	976	16.91	1001	17.51	1026	18.12	1050	18.72	1074	19.33	1097	19.94	1121	20.55	1143	21.17
17,000	979	18.32	1003	18.92	1027	19.53	1051	20.15	1074	20.77	1097	21.40	1120	22.03	1142	22.66	1164	23.29	1186	23.93
18,000	1032	21.15	1055	21.77	1078	22.40	1100	23.04	1123	23.68	1145	24.33	1166	24.98	1188	25.63	1209	26.28	1230	26.93
19,000	1086	24.24	1108	24.88	1129	25.52	1151	26.18	1172	26.84	1193	27.51	1214	28.18	1234	28.85	1255	29.52	1275	30.19
20,000	1140	27.60	1161	28.25	1181	28.92	1202	29.59	1222	30.27	1242	30.95	1262	31.64	1281	32.33	—	—	—	—

48AJ,AK050 (50 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	907	7.34	940	7.81	971	8.30	1001	8.79	1030	9.29	1059	9.79	1086	10.29	1113	10.80	1139	11.31	1164	11.83
9,000	930	8.46	961	8.95	991	9.46	1021	9.97	1050	10.48	1078	11.00	1105	11.52	1131	12.05	1157	12.58	1183	13.12
10,000	955	9.76	985	10.27	1014	10.79	1043	11.31	1071	11.84	1098	12.37	1125	12.91	1151	13.46	1177	14.01	1202	14.56
11,000	984	11.25	1012	11.77	1040	12.30	1068	12.84	1095	13.38	1121	13.93	1147	14.49	1172	15.05	1197	15.61	1222	16.18
12,000	1016	12.93	1043	13.47	1069	14.02	1095	14.57	1121	15.13	1147	15.69	1172	16.26	1196	16.83	1220	17.41	1244	18.00
13,000	1050	14.82	1076	15.38	1101	15.94	1126	16.51	1151	17.08	1175	17.66	1199	18.24	1223	18.83	1246	19.42	1269	20.02
14,000	1087	16.92	1111	17.49	1136	18.07	1159	18.66	1183	19.25	1206	19.84	1229	20.44	1252	21.04	1274	21.64	1296	22.25
15,000	1126	19.23	1149	19.83	1172	20.43	1195	21.03	1217	21.64	1239	22.25	1261	22.86	1283	23.48	—	—	—	—
16,000	1166	21.78	1188	22.40	1210	23.01	1232	23.64	1253	24.26	1275	24.89	1296	25.52	—	—	—	—	—	—
17,000	1208	24.56	1229	25.20	1250	25.84	1271	26.48	1291	27.12	—	—	—	—	—	—	—	—	—	—
18,000	1250	27.59	1271	28.25	1291	28.91	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19,000	1294	30.87	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 47 — Fan Performance — 48AJ,AK060 Units

48AJ,AK060 (60 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	476	4.33	534	5.04	585	5.78	632	6.56	674	7.39	714	8.24	751	9.12	786	10.02	819	10.93	851	11.85
14,000	536	6.19	588	6.96	636	7.74	680	8.56	720	9.41	758	10.30	793	11.21	827	12.15	859	13.11	890	14.08
15,000	566	7.28	617	8.09	662	8.90	704	9.73	744	10.59	781	11.50	816	12.42	849	13.38	881	14.36	911	15.35
16,000	597	8.48	645	9.34	689	10.17	730	11.02	768	11.90	804	12.82	839	13.76	871	14.73	902	15.72	932	16.73
17,000	628	9.80	674	10.71	717	11.58	756	12.45	793	13.34	829	14.27	862	15.23	894	16.21	925	17.21	954	18.24
18,000	659	11.25	704	12.21	745	13.11	783	14.00	819	14.91	853	15.85	886	16.82	918	17.82	948	18.84	977	19.88
19,000	691	12.82	734	13.84	773	14.77	810	15.69	845	16.62	879	17.58	911	18.56	942	19.57	971	20.60	1000	21.65
20,000	723	14.53	764	15.60	802	16.57	838	17.52	872	18.47	905	19.44	936	20.44	966	21.45	995	22.50	1023	23.57
21,000	755	16.37	794	17.49	831	18.51	866	19.49	899	20.47	931	21.46	961	22.47	991	23.50	1019	24.55	1047	25.63
22,000	787	18.35	825	19.53	861	20.59	894	21.60	927	22.61	958	23.62	987	24.64	1016	25.69	1044	26.76	1071	27.84
23,000	819	20.48	856	21.71	890	22.81	923	23.87	954	24.90	985	25.93	1014	26.97	1042	28.03	1069	29.11	1096	30.21
24,000	851	22.75	887	24.04	920	25.19	952	26.28	983	27.34	1012	28.40	1041	29.46	1068	30.54	1095	31.63	1121	32.74
25,000	883	25.17	918	26.52	951	27.72	982	28.84	1011	29.94	1040	31.02	1068	32.11	1095	33.21	1121	34.31	1147	35.44
26,000	916	27.76	950	29.15	981	30.40	1011	31.57	1040	32.70	1068	33.81	1095	34.92	1122	36.04	1147	37.16	1172	38.30
27,000	948	30.49	981	31.95	1012	33.24	1041	34.46	1070	35.62	1097	36.76	1123	37.90	1149	39.04	1174	40.18	1199	41.34

48AJ,AK060 (60 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	881	12.78	911	13.72	939	14.67	967	15.62	993	16.58	1019	17.54	1045	18.51	1069	19.48	1093	20.45	1117	21.43
14,000	920	15.06	948	16.06	976	17.07	1003	18.08	1029	19.11	1054	20.13	1079	21.17	1103	22.21	1126	23.26	1149	24.31
15,000	940	16.36	968	17.38	996	18.41	1022	19.45	1048	20.50	1073	21.56	1097	22.63	1121	23.70	1144	24.78	1167	25.86
16,000	961	17.76	989	18.80	1016	19.86	1042	20.92	1067	22.00	1092	23.08	1116	24.17	1140	25.28	1162	26.38	1185	27.49
17,000	983	19.28	1010	20.34	1036	21.42	1062	22.51	1087	23.60	1112	24.71	1135	25.83	1159	26.95	1181	28.09	—	—
18,000	1005	20.94	1032	22.01	1058	23.11	1083	24.21	1108	25.33	1132	26.46	1156	27.60	1178	28.74	—	—	—	—
19,000	1027	22.72	1054	23.81	1080	24.92	1105	26.04	1129	27.18	1153	28.33	1176	29.48	1199	30.65	—	—	—	—
20,000	1050	24.65	1076	25.76	1102	26.88	1126	28.01	1151	29.17	1174	30.33	1197	31.50	—	—	—	—	—	—
21,000	1073	26.73	1099	27.84	1124	28.97	1149	30.13	1173	31.29	1196	32.47	—	—	—	—	—	—	—	—
22,000	1097	28.95	1123	30.08	1147	31.22	1172	32.39	1195	33.56	—	—	—	—	—	—	—	—	—	—
23,000	1122	31.33	1147	32.47	1171	33.63	1195	34.80	—	—	—	—	—	—	—	—	—	—	—	—
24,000	1146	33.87	1171	35.02	1195	36.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25,000	1171	36.58	1196	37.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
26,000	1197	39.46	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
27,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND AND NOTES FOR TABLES 42-65.

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

Table 48 — Fan Performance — 50AJ,AK020,025 Units

50AJ,AK020,25 (20 THRU 25 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	394	1.06	398	1.08	464	1.42	523	1.77	575	2.13	622	2.50	666	2.87	707	3.24	745	3.62	781	4.01
5,000	388	1.26	428	1.47	489	1.83	545	2.21	595	2.60	642	2.99	685	3.39	726	3.79	764	4.20	800	4.61
6,000	398	1.59	463	1.97	520	2.36	572	2.76	620	3.17	664	3.59	706	4.01	746	4.44	783	4.87	819	5.31
7,000	441	2.18	501	2.60	554	3.02	602	3.44	647	3.87	690	4.31	730	4.75	769	5.20	805	5.66	840	6.12
7,500	463	2.52	521	2.96	572	3.39	619	3.83	663	4.27	704	4.72	744	5.17	781	5.63	817	6.10	852	6.56
8,000	486	2.90	542	3.36	591	3.80	637	4.25	679	4.70	720	5.16	758	5.62	795	6.09	830	6.57	864	7.05
9,000	532	3.76	585	4.26	631	4.73	674	5.20	714	5.68	752	6.16	789	6.64	824	7.13	858	7.62	890	8.12
10,000	579	4.76	629	5.30	673	5.81	713	6.31	751	6.81	788	7.31	822	7.81	856	8.32	888	8.83	919	9.34
11,000	627	5.91	674	6.50	716	7.04	754	7.57	791	8.09	825	8.62	858	9.14	890	9.66	921	10.20	951	10.73
12,000	675	7.23	720	7.86	760	8.44	797	9.00	831	9.55	864	10.09	896	10.64	926	11.18	956	11.73	985	12.28
12,500	699	7.96	743	8.60	782	9.20	818	9.78	852	10.34	884	10.90	915	11.45	945	12.01	974	12.57	1003	13.13
13,000	724	8.72	767	9.39	805	10.00	840	10.60	873	11.17	905	11.74	935	12.31	965	12.88	993	13.45	1021	14.01

50AJ,AK020,25 (20 THRU 25 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	815	4.40	847	4.79	879	5.19	909	5.59	938	6.00	965	6.40	992	6.81	1019	7.23	1044	7.65	1069	8.07
5,000	834	5.03	867	5.45	898	5.87	929	6.30	958	6.73	986	7.16	1013	7.60	1040	8.04	1065	8.48	1090	8.92
6,000	853	5.75	886	6.20	918	6.64	948	7.10	977	7.55	1005	8.01	1033	8.47	1059	8.93	1085	9.39	1110	9.86
7,000	874	6.58	906	7.05	937	7.52	967	7.99	996	8.47	1025	8.95	1052	9.43	1079	9.92	1104	10.41	1130	10.90
7,500	885	7.04	917	7.52	948	8.00	978	8.48	1006	8.97	1035	9.46	1062	9.96	1088	10.45	1114	10.95	1139	11.45
8,000	897	7.53	928	8.02	959	8.51	988	9.01	1017	9.50	1045	10.01	1072	10.51	1098	11.02	1124	11.53	1149	12.04
9,000	922	8.62	952	9.13	982	9.64	1011	10.15	1039	10.67	1066	11.19	1093	11.72	1119	12.24	1145	12.77	1169	13.30
10,000	950	9.86	979	10.39	1008	10.92	1036	11.45	1063	11.98	1090	12.52	1116	13.06	1142	13.61	1167	14.15	1191	14.71
11,000	980	11.26	1009	11.81	1037	12.35	1064	12.90	1090	13.45	1116	14.01	1141	14.56	1166	15.13	1191	15.69	—	—
12,000	1013	12.84	1040	13.40	1067	13.96	1093	14.52	1119	15.09	1144	15.66	1169	16.23	1193	16.81	—	—	—	—
12,500	1030	13.69	1057	14.26	1083	14.83	1109	15.40	1134	15.97	1159	16.55	1183	17.14	—	—	—	—	—	—
13,000	1048	14.59	1074	15.16	1100	15.74	1125	16.32	1150	16.90	1174	17.49	—	—	—	—	—	—	—	—

Legend and Notes on page 96.

Table 49 — Fan Performance — 50AJ,AK027,030 Units

50AJ,AK027,30 (27 THRU 30 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	394	1.42	450	1.74	508	2.11	562	2.50	611	2.90	656	3.31	699	3.72	739	4.14	776	4.56	812	4.98
6,000	404	1.62	468	2.01	525	2.40	576	2.80	624	3.21	668	3.63	710	4.05	750	4.48	787	4.91	823	5.35
7,000	449	2.23	508	2.65	560	3.07	608	3.49	653	3.92	695	4.36	736	4.81	774	5.26	810	5.72	845	6.18
8,000	496	2.98	550	3.43	599	3.88	644	4.32	686	4.78	726	5.24	764	5.70	801	6.17	836	6.65	869	7.13
8,250	508	3.18	561	3.65	609	4.10	653	4.55	695	5.01	734	5.47	772	5.95	808	6.42	843	6.90	876	7.38
9,000	544	3.86	595	4.35	640	4.83	682	5.30	722	5.77	760	6.25	796	6.74	831	7.23	864	7.72	897	8.22
10,000	592	4.90	640	5.43	683	5.93	723	6.43	760	6.93	796	7.43	830	7.93	864	8.44	896	8.95	927	9.47
11,000	641	6.09	687	6.66	727	7.19	765	7.72	801	8.24	835	8.76	867	9.29	899	9.82	930	10.35	959	10.88
12,000	691	7.45	734	8.06	772	8.62	808	9.18	842	9.73	875	10.27	906	10.82	936	11.36	966	11.91	994	12.47
13,000	741	8.98	782	9.63	819	10.23	853	10.81	886	11.39	917	11.96	947	12.52	976	13.09	1004	13.66	1031	14.23
13,750	779	10.25	818	10.92	854	11.55	887	12.16	919	12.75	949	13.34	978	13.93	1006	14.51	1033	15.09	1060	15.68
14,000	791	10.70	830	11.38	866	12.02	898	12.63	930	13.23	960	13.83	988	14.42	1016	15.01	1043	15.59	1070	16.18
15,000	842	12.60	879	13.32	913	13.99	945	14.63	975	15.26	1003	15.88	1031	16.50	1058	17.11	1084	17.72	1109	18.33

50AJ,AK027,30 (27 THRU 30 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	846	5.41	879	5.85	910	6.28	941	6.72	970	7.16	998	7.61	1025	8.06	1052	8.51	1078	8.96	1103	9.42
6,000	857	5.79	889	6.24	921	6.69	951	7.14	980	7.59	1008	8.05	1035	8.51	1062	8.97	1088	9.44	1113	9.91
7,000	878	6.64	910	7.11	941	7.58	971	8.05	1000	8.53	1028	9.01	1055	9.50	1082	9.98	1108	10.47	1133	10.96
8,000	902	7.61	933	8.10	964	8.59	993	9.09	1022	9.59	1049	10.09	1076	10.59	1102	11.10	1128	11.61	1153	12.12
8,250	908	7.88	939	8.37	969	8.87	999	9.37	1027	9.87	1055	10.38	1082	10.89	1108	11.40	1133	11.91	1158	12.43
9,000	928	8.72	959	9.23	988	9.74	1017	10.26	1045	10.78	1072	11.30	1098	11.82	1124	12.35	1150	12.88	1174	13.41
10,000	957	9.99	986	10.52	1015	11.04	1043	11.58	1070	12.11	1097	12.65	1122	13.19	1148	13.74	1173	14.29	1197	14.84
11,000	988	11.42	1017	11.96	1044	12.51	1071	13.06	1098	13.61	1123	14.17	1149	14.73	1173	15.29	1198	15.85	—	—
12,000	1022	13.02	1049	13.58	1076	14.14	1102	14.71	1127	15.28	1152	15.85	1177	16.42	—	—	—	—	—	—
13,000	1058	14.80	1084	15.38	1110	15.96	1135	16.54	1159	17.13	1184	17.71	—	—	—	—	—	—	—	—
13,750	1086	16.26	1111	16.85	1136	17.44	1161	18.04	1185	18.63	—	—	—	—	—	—	—	—	—	—
14,000	1095	16.77	1120	17.37	1145	17.96	1169	18.56	1193	19.16	—	—	—	—	—	—	—	—	—	—
15,000	1134	18.94	1158	19.55	1182	20.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 96.

Table 50 — Fan Performance — 50AJ,AK035 Units

50AJ,AK035 (35 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	517	2.72	568	3.14	616	3.56	660	3.99	702	4.43	742	4.88	779	5.33	815	5.79	850	6.25	883	6.71
8,000	569	3.59	616	4.04	660	4.49	701	4.94	740	5.40	778	5.87	814	6.34	848	6.82	881	7.30	913	7.79
9,000	622	4.63	665	5.10	706	5.58	744	6.05	781	6.54	816	7.02	851	7.52	883	8.01	915	8.51	946	9.02
10,000	675	5.84	716	6.34	754	6.84	790	7.34	824	7.84	858	8.35	890	8.86	921	9.37	952	9.89	981	10.42
10,500	702	6.51	741	7.02	778	7.53	813	8.04	847	8.56	879	9.07	910	9.59	941	10.12	971	10.65	999	11.18
11,000	729	7.23	767	7.75	803	8.27	837	8.80	869	9.32	901	9.85	931	10.38	961	10.91	990	11.45	1018	11.99
12,000	784	8.80	819	9.35	853	9.90	885	10.44	916	10.99	946	11.54	975	12.09	1003	12.64	1031	13.20	1058	13.76
13,000	839	10.57	872	11.15	904	11.72	934	12.29	964	12.86	992	13.42	1020	13.99	1047	14.56	1073	15.14	1099	15.72
14,000	894	12.54	925	13.15	955	13.74	984	14.33	1012	14.92	1039	15.51	1066	16.10	1092	16.69	1117	17.28	1142	17.88
15,000	949	14.73	979	15.36	1008	15.98	1035	16.59	1062	17.20	1088	17.81	1113	18.42	1138	19.03	1162	19.64	1186	20.25
16,000	1005	17.13	1033	17.78	1060	18.43	1087	19.06	1112	19.69	1137	20.32	1161	20.95	1185	21.58	1208	22.21	1231	22.84
17,000	1061	19.76	1088	20.43	1114	21.10	1139	21.76	1163	22.41	1187	23.06	1210	23.71	1233	24.36	1256	25.01	1277	25.66
17,500	1088	21.16	1115	21.84	1140	22.52	1165	23.19	1189	23.85	1212	24.52	1235	25.17	1257	25.83	1279	26.49	—	—

50AJ,AK035 (35 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	915	7.18	946	7.65	976	8.13	1005	8.61	1033	9.09	1060	9.57	1086	10.06	1112	10.54	1137	11.04	1161	11.53
8,000	944	8.28	974	8.77	1003	9.27	1032	9.77	1059	10.27	1086	10.78	1112	11.29	1137	11.80	1162	12.31	1186	12.82
9,000	976	9.53	1005	10.04	1033	10.56	1061	11.08	1088	11.61	1114	12.13	1139	12.66	1164	13.19	1189	13.72	1212	14.26
10,000	1010	10.95	1038	11.48	1065	12.02	1092	12.55	1118	13.09	1143	13.64	1168	14.19	1193	14.74	1216	15.29	1240	15.84
10,500	1028	11.72	1055	12.26	1082	12.81	1108	13.35	1134	13.90	1159	14.46	1183	15.02	1207	15.57	1231	16.14	1254	16.70
11,000	1046	12.54	1073	13.09	1099	13.64	1125	14.20	1150	14.76	1175	15.32	1199	15.89	1223	16.45	1246	17.03	1269	17.60
12,000	1084	14.32	1110	14.89	1135	15.46	1160	16.03	1185	16.61	1208	17.19	1232	17.77	1255	18.35	1278	18.94	1300	19.53
13,000	1124	16.30	1149	16.88	1173	17.47	1197	18.06	1221	18.65	1244	19.24	1267	19.84	1289	20.44	—	—	—	—
14,000	1166	18.48	1190	19.08	1213	19.68	1236	20.29	1259	20.89	1281	21.50	—	—	—	—	—	—	—	—
15,000	1209	20.87	1232	21.48	1255	22.10	1277	22.72	1299	23.35	—	—	—	—	—	—	—	—	—	—
16,000	1254	23.48	1276	24.11	1297	24.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,000	1299	26.31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 96.

Table 51 — Fan Performance — 50AJ,AK020,025 Units

50AJ,AK040 (40 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	475	2.69	523	3.08	569	3.47	612	3.86	653	4.26	692	4.66	730	5.07	767	5.49	802	5.92	836	6.36
9,000	521	3.53	565	3.94	606	4.36	646	4.78	684	5.20	721	5.63	757	6.06	791	6.49	825	6.94	857	7.39
10,000	568	4.52	608	4.96	646	5.40	683	5.84	719	6.29	753	6.74	787	7.20	819	7.65	851	8.11	882	8.58
11,000	615	5.68	652	6.14	687	6.60	722	7.07	755	7.55	788	8.02	819	8.50	850	8.97	880	9.46	909	9.94
12,000	663	7.01	697	7.49	730	7.98	762	8.47	794	8.97	824	9.47	854	9.96	883	10.47	912	10.97	939	11.48
13,000	712	8.53	743	9.03	774	9.54	804	10.05	834	10.57	862	11.09	891	11.61	918	12.13	945	12.66	972	13.19
14,000	760	10.24	790	10.76	819	11.29	847	11.82	875	12.36	902	12.90	929	13.45	955	13.99	981	14.54	1006	15.09
15,000	809	12.15	837	12.69	864	13.24	891	13.79	917	14.35	943	14.91	968	15.48	993	16.04	1018	16.62	1042	17.18
16,000	859	14.27	885	14.83	910	15.40	936	15.97	960	16.55	985	17.13	1009	17.71	1033	18.30	1056	18.89	1079	19.48
17,000	908	16.61	933	17.19	957	17.77	981	18.36	1004	18.96	1028	19.56	1051	20.16	1073	20.77	1096	21.38	1118	21.99
18,000	958	19.18	981	19.77	1004	20.37	1027	20.98	1049	21.60	1071	22.22	1093	22.84	1115	23.46	1136	24.09	1157	24.72
19,000	1007	21.98	1030	22.59	1052	23.21	1073	23.84	1095	24.47	1116	25.10	1137	25.74	1157	26.39	1178	27.04	1198	27.68
20,000	1057	25.02	1079	25.65	1099	26.29	1120	26.93	1140	27.58	1161	28.23	1181	28.89	—	—	—	—	—	—

50AJ,AK040 (40 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	870	6.81	902	7.26	933	7.73	964	8.20	993	8.67	1022	9.16	1050	9.65	1077	10.14	1104	10.64	1129	11.15
9,000	889	7.85	920	8.31	950	8.79	979	9.27	1008	9.75	1036	10.25	1064	10.75	1090	11.26	1117	11.77	1142	12.29
10,000	912	9.05	941	9.53	970	10.02	998	10.51	1026	11.00	1053	11.51	1080	12.02	1106	12.54	1131	13.06	1157	13.59
11,000	938	10.43	966	10.92	993	11.42	1020	11.93	1047	12.44	1073	12.95	1099	13.47	1124	14.00	1149	14.53	1173	15.07
12,000	967	11.98	993	12.49	1020	13.01	1046	13.53	1071	14.05	1096	14.58	1121	15.11	1145	15.65	1169	16.19	1192	16.74
13,000	998	13.72	1023	14.25	1049	14.78	1073	15.32	1098	15.86	1121	16.40	1145	16.95	1168	17.50	1191	18.06	1214	18.62
14,000	1031	15.64	1055	16.19	1079	16.75	1103	17.30	1126	17.86	1149	18.42	1172	18.98	1195	19.55	1217	20.12	1239	20.69
15,000	1066	17.76	1089	18.33	1112	18.90	1135	19.48	1157	20.06	1179	20.63	1201	21.21	1223	21.80	1244	22.38	1265	22.97
16,000	1102	20.08	1124	20.67	1147	21.26	1168	21.86	1190	22.46	1211	23.06	1232	23.66	1253	24.26	1274	24.86	1294	25.46
17,000	1140	22.61	1161	23.22	1182	23.84	1203	24.45	1224	25.07	1245	25.69	1265	26.31	1285	26.93	—	—	—	—
18,000	1178	25.36	1199	25.99	1219	26.63	1240	27.26	1260	27.90	1279	28.54	1299	29.18	—	—	—	—	—	—
19,000	1218	28.34	1238	28.99	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 96.

Table 52 — Fan Performance — 50AJ,AK050 Units

50AJ,AK050 (50 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	485	2.76	532	3.15	577	3.54	620	3.94	661	4.34	700	4.74	737	5.16	774	5.58	809	6.01	843	6.45
9,000	530	3.62	574	4.03	615	4.45	655	4.87	692	5.29	729	5.72	764	6.15	798	6.59	832	7.03	864	7.49
10,000	577	4.62	617	5.06	655	5.50	692	5.95	727	6.40	761	6.85	794	7.30	827	7.76	858	8.22	889	8.69
11,000	625	5.80	661	6.26	697	6.73	731	7.20	764	7.67	796	8.14	827	8.62	858	9.10	888	9.58	917	10.07
12,000	673	7.15	707	7.63	740	8.12	772	8.62	803	9.11	833	9.61	863	10.11	891	10.61	920	11.12	947	11.62
13,000	722	8.69	753	9.19	784	9.70	814	10.22	843	10.74	872	11.26	900	11.78	927	12.31	954	12.83	980	13.36
14,000	771	10.43	800	10.95	829	11.48	857	12.01	885	12.55	912	13.10	938	13.64	964	14.19	990	14.74	1015	15.29
15,000	821	12.37	848	12.91	875	13.46	901	14.01	928	14.57	953	15.14	978	15.70	1003	16.27	1028	16.84	1052	17.41
16,000	870	14.52	896	15.08	922	15.65	947	16.22	971	16.80	996	17.39	1020	17.97	1043	18.56	1066	19.15	1089	19.75
17,000	920	16.89	945	17.48	969	18.06	993	18.65	1016	19.25	1039	19.86	1062	20.46	1084	21.07	1107	21.68	1129	22.30
18,000	971	19.50	994	20.10	1017	20.71	1039	21.32	1061	21.93	1083	22.55	1105	23.18	1126	23.80	1148	24.44	1169	25.07
19,000	1021	22.35	1043	22.96	1065	23.59	1086	24.21	1107	24.85	1128	25.49	1149	26.13	1170	26.78	1190	27.42	1210	28.08
20,000	1071	25.43	1092	26.07	1113	26.71	1133	27.36	1154	28.01	1174	28.66	1194	29.33	1213	29.99	1233	30.65	1252	31.33

50AJ,AK050 (50 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	876	6.90	908	7.35	939	7.82	970	8.29	999	8.77	1027	9.25	1055	9.74	1082	10.24	1109	10.74	1134	11.25
9,000	896	7.95	926	8.41	956	8.89	986	9.37	1014	9.86	1042	10.36	1069	10.86	1096	11.37	1122	11.88	1148	12.40
10,000	919	9.17	948	9.64	977	10.13	1005	10.62	1032	11.12	1059	11.63	1086	12.14	1112	12.66	1137	13.18	1162	13.71
11,000	945	10.56	973	11.05	1001	11.55	1027	12.06	1054	12.57	1080	13.09	1105	13.61	1130	14.14	1155	14.67	1179	15.21
12,000	975	12.13	1001	12.64	1027	13.16	1053	13.68	1078	14.21	1103	14.74	1128	15.27	1152	15.81	1176	16.35	1199	16.90
13,000	1006	13.89	1032	14.42	1057	14.96	1081	15.49	1105	16.03	1129	16.58	1153	17.12	1176	17.68	1199	18.23	1221	18.80
14,000	1040	15.84	1064	16.39	1088	16.94	1112	17.50	1135	18.06	1158	18.62	1180	19.18	1203	19.75	1225	20.32	1246	20.90
15,000	1075	17.99	1098	18.56	1121	19.13	1144	19.71	1166	20.29	1188	20.86	1210	21.45	1231	22.03	1253	22.62	1274	23.21
16,000	1112	20.34	1134	20.93	1156	21.53	1178	22.12	1199	22.72	1221	23.32	1241	23.92	1262	24.52	1283	25.13	—	—
17,000	1150	22.91	1172	23.52	1193	24.14	1214	24.76	1234	25.37	1255	25.99	1275	26.61	1295	27.23	—	—	—	—
18,000	1190	25.70	1210	26.34	1230	26.97	1250	27.61	1270	28.25	1290	28.89	—	—	—	—	—	—	—	—
19,000	1230	28.73	1250	29.38	1269	30.04	1289	30.70	—	—	—	—	—	—	—	—	—	—	—	—
20,000	1271	31.99	1290	32.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 53 — Fan Performance — 50AJ,AK060 Units

50AJ,AK060 (60 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	450	4.02	509	4.71	560	5.41	605	6.12	647	6.86	686	7.62	723	8.40	757	9.21	790	10.04	821	10.89
14,000	505	5.74	558	6.49	606	7.24	649	8.01	689	8.79	727	9.59	762	10.40	795	11.24	827	12.09	857	12.96
15,000	533	6.75	584	7.53	630	8.32	672	9.11	711	9.91	748	10.73	782	11.56	815	12.41	846	13.28	876	14.17
16,000	561	7.88	610	8.68	655	9.50	696	10.32	734	11.14	770	11.98	803	12.84	836	13.71	866	14.59	896	15.49
17,000	590	9.12	637	9.95	680	10.79	720	11.64	757	12.49	792	13.35	825	14.23	857	15.12	887	16.02	916	16.94
18,000	619	10.48	664	11.33	706	12.20	744	13.07	781	13.96	815	14.84	847	15.74	878	16.65	908	17.57	937	18.50
19,000	648	11.96	692	12.84	732	13.74	769	14.64	805	15.54	838	16.45	870	17.37	900	18.30	930	19.24	958	20.19
20,000	678	13.57	719	14.47	758	15.40	795	16.32	829	17.25	862	18.19	893	19.13	923	20.08	952	21.04	979	22.01
21,000	707	15.30	748	16.24	785	17.19	821	18.14	854	19.09	886	20.05	917	21.02	946	22.00	974	22.98	1001	23.97
22,000	737	17.18	776	18.14	812	19.11	847	20.09	879	21.07	911	22.06	940	23.05	969	24.04	997	25.05	1024	26.06
23,000	767	19.20	804	20.18	840	21.17	873	22.17	905	23.18	935	24.19	965	25.21	993	26.23	1020	27.25	1046	28.28
24,000	797	21.35	833	22.36	867	23.38	900	24.40	931	25.43	961	26.47	989	27.51	1017	28.55	1044	29.60	1070	30.65
25,000	827	23.66	862	24.68	895	25.72	927	26.78	957	27.83	986	28.89	1014	29.95	1041	31.02	1068	32.09	1093	33.17
26,000	857	26.11	891	27.16	923	28.23	954	29.30	984	30.38	1012	31.46	1040	32.55	1066	33.64	1092	34.73	1117	35.83
27,000	888	28.72	920	29.79	952	30.88	982	31.97	1011	33.08	1038	34.19	1065	35.29	1091	36.40	1117	37.52	1141	38.64

50AJ,AK060 (60 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	851	11.75	880	12.63	907	13.53	934	14.45	960	15.38	985	16.32	1010	17.28	1033	18.24	1057	19.22	1079	20.22
14,000	886	13.85	915	14.76	942	15.68	968	16.62	993	17.57	1018	18.54	1042	19.52	1066	20.51	1088	21.52	1111	22.53
15,000	905	15.07	933	15.99	960	16.92	986	17.87	1011	18.83	1035	19.81	1059	20.81	1082	21.81	1105	22.82	1127	23.85
16,000	924	16.41	952	17.34	978	18.28	1004	19.25	1029	20.22	1053	21.21	1077	22.21	1100	23.22	1122	24.25	1144	25.29
17,000	944	17.86	971	18.81	997	19.77	1023	20.74	1047	21.73	1071	22.73	1095	23.74	1117	24.76	1140	25.80	1161	26.85
18,000	964	19.45	991	20.41	1017	21.38	1042	22.36	1066	23.36	1090	24.37	1113	25.40	1136	26.43	1158	27.48	1179	28.54
19,000	985	21.15	1011	22.13	1037	23.12	1061	24.11	1085	25.13	1109	26.15	1132	27.19	1154	28.24	1176	29.29	1197	30.36
20,000	1006	22.99	1032	23.98	1057	24.99	1081	26.00	1105	27.03	1128	28.06	1151	29.11	1173	30.17	1195	31.24	—	—
21,000	1028	24.97	1053	25.97	1078	26.99	1102	28.02	1126	29.06	1148	30.11	1171	31.17	1193	32.25	—	—	—	—
22,000	1050	27.08	1075	28.10	1099	29.14	1123	30.18	1146	31.24	1169	32.30	1191	33.38	—	—	—	—	—	—
23,000	1072	29.32	1097	30.37	1121	31.42	1144	32.48	1167	33.55	1190	34.64	—	—	—	—	—	—	—	—
24,000	1095	31.71	1119	32.78	1143	33.85	1166	34.93	1189	36.02	—	—	—	—	—	—	—	—	—	—
25,000	1118	34.25	1142	35.33	1165	36.42	1188	37.52	—	—	—	—	—	—	—	—	—	—	—	—
26,000	1141	36.93	1165	38.04	1188	39.15	—	—	—	—	—	—	—	—	—	—	—	—	—	—
27,000	1165	39.76	1188	40.89	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND AND NOTES FOR TABLES 42-65.

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

Table 54 — Fan Performance — 48AW,AY020,025 Units

48AW,AY020,025 (20 THRU 25 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	394	1.06	422	1.20	486	1.56	542	1.94	594	2.34	640	2.74	683	3.15	724	3.57	762	4.00	797	4.42
5,000	394	1.29	461	1.66	520	2.04	573	2.44	622	2.85	667	3.28	709	3.72	749	4.16	786	4.61	822	5.07
6,000	445	1.87	505	2.26	559	2.66	609	3.08	655	3.51	698	3.95	738	4.41	777	4.87	813	5.35	848	5.82
7,000	498	2.59	553	3.01	603	3.44	649	3.87	692	4.32	732	4.78	771	5.25	808	5.73	843	6.22	877	6.72
7,500	526	3.02	578	3.45	626	3.89	670	4.33	712	4.79	751	5.26	789	5.74	825	6.22	859	6.72	893	7.22
8,000	554	3.48	604	3.93	650	4.38	692	4.84	733	5.30	771	5.78	808	6.26	843	6.76	877	7.26	909	7.77
9,000	610	4.55	657	5.03	699	5.51	739	5.98	777	6.47	813	6.96	848	7.46	881	7.97	913	8.48	944	9.01
10,000	668	5.80	711	6.31	751	6.82	788	7.32	824	7.82	858	8.33	891	8.85	922	9.37	953	9.90	983	10.44
11,000	727	7.25	766	7.79	804	8.32	839	8.85	872	9.37	905	9.90	936	10.44	966	10.98	995	11.52	1024	12.07
12,000	786	8.90	823	9.48	858	10.03	891	10.59	923	11.13	953	11.68	983	12.24	1012	12.79	1040	13.35	1067	13.92
12,500	816	9.81	852	10.40	885	10.97	918	11.53	949	12.09	978	12.66	1007	13.22	1035	13.78	1063	14.35	1089	14.93
13,000	846	10.77	880	11.38	913	11.96	944	12.54	975	13.11	1004	13.68	1032	14.25	1059	14.83	1086	15.41	1112	15.99

48AW,AY020,025 (20 THRU 25 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	832	4.86	864	5.29	895	5.74	925	6.18	954	6.63	982	7.08	1009	7.53	1035	7.99	1060	8.45	1085	8.91
5,000	856	5.53	889	6.00	920	6.47	950	6.95	979	7.42	1007	7.91	1034	8.39	1061	8.88	1086	9.37	1111	9.86
6,000	882	6.31	914	6.80	945	7.30	975	7.80	1004	8.30	1032	8.81	1059	9.32	1085	9.84	1111	10.35	1136	10.87
7,000	910	7.22	941	7.73	971	8.25	1001	8.77	1029	9.29	1057	9.82	1084	10.36	1110	10.89	1136	11.43	1161	11.98
7,500	925	7.73	956	8.25	986	8.78	1015	9.31	1043	9.84	1071	10.38	1097	10.92	1123	11.47	1149	12.02	1173	12.57
8,000	941	8.29	971	8.82	1001	9.35	1029	9.89	1057	10.43	1084	10.98	1111	11.53	1137	12.08	1162	12.64	1187	13.21
9,000	975	9.54	1004	10.08	1033	10.62	1061	11.18	1088	11.73	1114	12.30	1140	12.86	1165	13.44	1190	14.01	—	—
10,000	1012	10.98	1040	11.54	1068	12.09	1094	12.66	1121	13.23	1146	13.80	1171	14.38	1196	14.97	—	—	—	—
11,000	1052	12.63	1079	13.20	1105	13.76	1131	14.34	1156	14.92	1181	15.51	—	—	—	—	—	—	—	—
12,000	1094	14.49	1120	15.07	1145	15.65	1170	16.24	1194	16.83	—	—	—	—	—	—	—	—	—	—
12,500	1115	15.51	1141	16.09	1166	16.68	1190	17.27	—	—	—	—	—	—	—	—	—	—	—	—
13,000	1138	16.58	1163	17.16	1187	17.76	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 99.

Table 55 — Fan Performance — 48AW,AY027,030 Units

48AW,AY027,030 (27 THRU 30 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	424	1.59	487	1.97	543	2.36	594	2.77	641	3.20	685	3.63	726	4.08	765	4.54	802	5.00	838	5.47
6,000	451	1.90	511	2.29	564	2.70	613	3.12	659	3.55	702	4.00	742	4.45	780	4.92	817	5.39	851	5.87
7,000	506	2.65	560	3.07	609	3.49	654	3.93	697	4.38	737	4.84	776	5.31	813	5.79	848	6.28	881	6.78
8,000	562	3.56	612	4.01	657	4.46	699	4.91	739	5.38	777	5.86	814	6.34	848	6.84	882	7.35	914	7.86
8,250	577	3.81	625	4.27	669	4.73	711	5.19	750	5.66	788	6.14	824	6.63	858	7.13	891	7.64	923	8.15
9,000	620	4.65	666	5.13	707	5.60	747	6.08	784	6.57	820	7.06	855	7.56	888	8.07	920	8.59	951	9.12
10,000	679	5.93	721	6.44	760	6.94	797	7.44	832	7.94	866	8.45	898	8.97	930	9.50	960	10.03	990	10.57
11,000	738	7.40	777	7.94	814	8.47	849	9.00	882	9.52	914	10.05	944	10.59	974	11.13	1003	11.68	1032	12.23
12,000	798	9.09	835	9.66	869	10.22	902	10.77	933	11.32	963	11.86	993	12.42	1021	12.98	1049	13.54	1076	14.11
13,000	859	11.01	893	11.60	925	12.18	956	12.75	986	13.33	1015	13.90	1042	14.47	1070	15.04	1096	15.63	1122	16.21
13,750	905	12.59	937	13.20	968	13.80	997	14.39	1026	14.98	1054	15.57	1081	16.16	1107	16.75	1133	17.34	1158	17.94
14,000	920	13.14	952	13.76	982	14.37	1011	14.97	1040	15.56	1067	16.16	1094	16.75	1120	17.34	1145	17.94	1170	18.54
15,000	981	15.52	1011	16.17	1040	16.80	1068	17.42	1095	18.04	1121	18.65	1146	19.27	1171	19.88	1195	20.50	—	—

48AW,AY027,030 (27 THRU 30 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	871	5.94	904	6.42	935	6.91	965	7.40	994	7.89	1022	8.39	1049	8.88	1075	9.39	1101	9.89	1126	10.40
6,000	885	6.36	917	6.85	948	7.34	978	7.85	1006	8.35	1034	8.86	1061	9.37	1088	9.88	1113	10.40	1138	10.92
7,000	914	7.29	945	7.80	975	8.31	1005	8.84	1033	9.36	1061	9.89	1087	10.42	1114	10.96	1139	11.50	1164	12.05
8,000	946	8.38	976	8.90	1005	9.44	1034	9.98	1062	10.52	1089	11.07	1115	11.62	1141	12.18	1166	12.74	1191	13.30
8,250	954	8.68	984	9.21	1013	9.74	1042	10.29	1069	10.83	1096	11.39	1122	11.94	1148	12.50	1173	13.07	1197	13.64
9,000	981	9.65	1010	10.19	1038	10.74	1066	11.29	1093	11.85	1119	12.41	1145	12.98	1170	13.55	1195	14.13	—	—
10,000	1019	11.12	1047	11.67	1074	12.23	1101	12.79	1127	13.37	1152	13.94	1177	14.52	—	—	—	—	—	—
11,000	1059	12.79	1086	13.36	1113	13.93	1138	14.51	1163	15.09	1188	15.68	—	—	—	—	—	—	—	—
12,000	1102	14.68	1128	15.26	1153	15.85	1178	16.43	—	—	—	—	—	—	—	—	—	—	—	—
13,000	1147	16.80	1172	17.39	1196	17.99	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13,750	1182	18.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14,000	1194	19.15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 99.

Table 56 — Fan Performance — 48AW,AY035 Units)

48AW,AY035 (35 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	568	3.13	616	3.56	661	4.00	704	4.45	744	4.91	782	5.39	818	5.87	853	6.36	886	6.86	919	7.37
8,000	629	4.17	673	4.62	714	5.08	753	5.55	791	6.03	826	6.52	861	7.02	894	7.53	926	8.05	957	8.57
9,000	690	5.40	731	5.88	769	6.36	805	6.85	840	7.35	874	7.86	907	8.37	938	8.90	968	9.43	998	9.96
10,000	753	6.85	790	7.35	826	7.85	860	8.36	892	8.88	924	9.40	955	9.93	985	10.47	1013	11.02	1042	11.57
10,500	784	7.65	820	8.16	855	8.68	887	9.20	919	9.72	950	10.25	980	10.79	1009	11.34	1037	11.89	1064	12.45
11,000	816	8.50	851	9.03	884	9.56	916	10.09	946	10.62	976	11.16	1005	11.71	1033	12.27	1061	12.82	1088	13.39
12,000	879	10.39	912	10.94	943	11.49	973	12.04	1002	12.60	1030	13.15	1057	13.72	1084	14.29	1110	14.86	1136	15.44
13,000	943	12.51	973	13.09	1003	13.66	1031	14.23	1058	14.81	1085	15.38	1111	15.96	1137	16.55	1162	17.14	1186	17.74
14,000	1007	14.89	1036	15.48	1063	16.07	1090	16.67	1116	17.26	1141	17.86	1166	18.46	1191	19.06	1214	19.67	1238	20.28
15,000	1072	17.52	1098	18.13	1125	18.75	1150	19.36	1175	19.97	1199	20.59	1222	21.21	1246	21.83	1268	22.45	1291	23.08
16,000	1136	20.41	1162	21.05	1186	21.68	1210	22.32	1234	22.95	1257	23.58	1280	24.22	—	—	—	—	—	—
17,000	1201	23.58	1225	24.24	1248	24.89	1271	25.55	1294	26.20	—	—	—	—	—	—	—	—	—	—
17,500	1233	25.27	1257	25.94	1280	26.60	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48AW,AY035 (35 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	950	7.88	980	8.39	1009	8.92	1037	9.44	1065	9.97	1092	10.51	1118	11.05	1143	11.59	1168	12.13	1192	12.68
8,000	987	9.10	1016	9.63	1044	10.17	1072	10.72	1099	11.27	1125	11.82	1150	12.38	1175	12.94	1199	13.51	1223	14.08
9,000	1027	10.51	1055	11.06	1082	11.62	1109	12.18	1135	12.74	1160	13.31	1185	13.89	1209	14.47	1233	15.05	1256	15.64
10,000	1069	12.13	1096	12.69	1122	13.26	1148	13.84	1173	14.42	1198	15.00	1222	15.59	1245	16.19	1268	16.79	1291	17.39
10,500	1091	13.02	1118	13.59	1143	14.16	1168	14.75	1193	15.33	1217	15.93	1241	16.53	1264	17.13	1287	17.73	—	—
11,000	1114	13.96	1140	14.54	1165	15.13	1190	15.72	1214	16.31	1238	16.91	1261	17.51	1284	18.12	—	—	—	—
12,000	1161	16.03	1186	16.62	1210	17.22	1234	17.82	1257	18.43	1280	19.04	—	—	—	—	—	—	—	—
13,000	1210	18.34	1234	18.94	1257	19.56	1280	20.17	—	—	—	—	—	—	—	—	—	—	—	—
14,000	1261	20.90	1283	21.52	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 99.

Table 57 — Fan Performance — 48AW,AY040 Units

48AW,AY040 (40 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	526	3.10	573	3.50	617	3.91	660	4.33	700	4.75	740	5.18	778	5.62	814	6.07	850	6.53	884	7.00
9,000	579	4.08	621	4.51	662	4.95	701	5.39	738	5.83	775	6.28	810	6.74	845	7.21	878	7.69	911	8.17
10,000	633	5.24	671	5.70	709	6.16	744	6.62	779	7.09	813	7.57	846	8.05	879	8.53	910	9.03	941	9.53
11,000	687	6.59	723	7.07	757	7.56	790	8.05	823	8.54	854	9.04	885	9.54	916	10.05	945	10.56	974	11.08
12,000	742	8.15	775	8.65	807	9.17	838	9.68	868	10.20	898	10.72	927	11.24	955	11.77	983	12.30	1011	12.84
13,000	797	9.92	827	10.45	857	10.98	887	11.52	915	12.07	943	12.61	970	13.15	997	13.70	1024	14.25	1050	14.81
14,000	852	11.92	881	12.47	909	13.03	936	13.59	963	14.15	990	14.72	1016	15.29	1041	15.86	1066	16.43	1091	17.01
15,000	908	14.15	935	14.72	961	15.31	987	15.89	1013	16.48	1038	17.06	1062	17.65	1086	18.25	1110	18.84	1134	19.44
16,000	964	16.63	989	17.23	1014	17.83	1039	18.43	1063	19.04	1086	19.65	1110	20.26	1133	20.88	1156	21.49	1178	22.11
17,000	1021	19.37	1044	19.98	1068	20.60	1091	21.23	1114	21.86	1136	22.49	1158	23.12	1180	23.76	1202	24.39	1223	25.03
18,000	1077	22.37	1099	23.01	1122	23.64	1144	24.29	1165	24.94	1187	25.59	1208	26.25	1229	26.90	1250	27.56	1270	28.22
19,000	1133	25.65	1155	26.30	1176	26.96	1197	27.62	1217	28.29	1238	28.96	—	—	—	—	—	—	—	—
20,000	1190	29.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48AW,AY040 (40 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	917	7.48	949	7.96	980	8.44	1010	8.94	1039	9.43	1067	9.93	1094	10.44	1121	10.95	1147	11.46	1172	11.98
9,000	942	8.66	973	9.16	1003	9.66	1033	10.17	1061	10.69	1089	11.21	1116	11.73	1142	12.26	1168	12.80	1193	13.33
10,000	971	10.03	1001	10.55	1030	11.06	1058	11.59	1086	12.12	1113	12.66	1139	13.20	1165	13.75	1190	14.30	1215	14.86
11,000	1003	11.60	1031	12.13	1059	12.67	1086	13.21	1112	13.75	1139	14.31	1164	14.86	1189	15.43	1214	15.99	1238	16.56
12,000	1038	13.38	1065	13.92	1091	14.47	1117	15.03	1142	15.59	1167	16.16	1192	16.73	1216	17.31	1240	17.89	1264	18.48
13,000	1075	15.37	1101	15.93	1126	16.50	1150	17.07	1175	17.65	1199	18.23	1222	18.82	1246	19.41	1269	20.00	1291	20.61
14,000	1115	17.59	1139	18.17	1163	18.75	1186	19.34	1210	19.94	1232	20.53	1255	21.14	1277	21.74	1300	22.35	—	—
15,000	1157	20.04	1180	20.64	1202	21.24	1225	21.85	1247	22.46	1269	23.07	1290	23.69	—	—	—	—	—	—
16,000	1200	22.73	1222	23.35	1243	23.97	1265	24.60	1286	25.23	—	—	—	—	—	—	—	—	—	—
17,000	1245	25.67	1266	26.32	1286	26.96	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18,000	1290	28.88	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 99.

Table 58 — Fan Performance — 48AW,AY050 Units

48AW,AY050 (50 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	536	3.18	582	3.58	626	3.99	668	4.41	708	4.83	747	5.27	785	5.71	821	6.16	857	6.63	891	7.09
9,000	588	4.17	630	4.60	670	5.04	709	5.48	746	5.93	782	6.38	818	6.84	852	7.31	885	7.79	918	8.28
10,000	642	5.35	680	5.80	717	6.27	753	6.73	787	7.20	821	7.68	854	8.16	886	8.65	917	9.14	948	9.65
11,000	696	6.72	732	7.20	766	7.69	799	8.18	831	8.67	863	9.17	893	9.68	923	10.18	953	10.70	982	11.21
12,000	751	8.29	784	8.80	816	9.32	847	9.83	877	10.35	906	10.87	935	11.40	964	11.92	991	12.46	1019	12.99
13,000	807	10.09	837	10.62	867	11.16	896	11.70	924	12.24	952	12.78	979	13.33	1006	13.88	1032	14.43	1058	14.99
14,000	863	12.12	891	12.67	919	13.23	946	13.79	973	14.36	999	14.92	1025	15.49	1050	16.06	1075	16.64	1100	17.21
15,000	919	14.38	946	14.96	972	15.54	997	16.12	1023	16.71	1047	17.30	1072	17.89	1096	18.48	1120	19.08	1143	19.68
16,000	975	16.90	1000	17.49	1025	18.09	1049	18.70	1073	19.31	1097	19.92	1120	20.53	1143	21.15	1165	21.76	1188	22.38
17,000	1032	19.67	1056	20.29	1079	20.91	1102	21.54	1125	22.17	1147	22.80	1169	23.44	1191	24.07	1213	24.71	1234	25.35
18,000	1089	22.71	1111	23.35	1134	23.99	1155	24.64	1177	25.29	1198	25.95	1219	26.60	1240	27.26	1261	27.92	1281	28.58
19,000	1146	26.04	1167	26.69	1188	27.35	1209	28.02	1230	28.69	1250	29.37	1270	30.04	1290	30.72	—	—	—	—
20,000	1203	29.65	1224	30.32	1244	31.00	1263	31.69	1283	32.38	—	—	—	—	—	—	—	—	—	—

48AW,AY050 (50 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	923	7.57	955	8.05	986	8.54	1016	9.03	1045	9.53	1073	10.03	1100	10.54	1126	11.05	1152	11.56	1177	12.08
9,000	949	8.77	980	9.27	1010	9.77	1039	10.28	1067	10.80	1095	11.32	1122	11.85	1148	12.38	1174	12.91	1199	13.45
10,000	978	10.15	1008	10.67	1036	11.19	1064	11.72	1092	12.25	1119	12.79	1145	13.33	1171	13.88	1196	14.43	1221	14.99
11,000	1010	11.74	1038	12.27	1066	12.81	1093	13.35	1119	13.90	1145	14.45	1171	15.01	1196	15.57	1220	16.14	1245	16.72
12,000	1046	13.53	1072	14.08	1098	14.63	1124	15.19	1149	15.76	1174	16.32	1199	16.90	1223	17.48	1247	18.06	1270	18.65
13,000	1084	15.55	1109	16.11	1134	16.68	1158	17.26	1182	17.84	1206	18.42	1230	19.01	1253	19.60	1276	20.20	1299	20.80
14,000	1124	17.79	1148	18.38	1171	18.97	1195	19.55	1218	20.15	1241	20.75	1263	21.35	1285	21.96	—	—	—	—
15,000	1166	20.27	1189	20.88	1211	21.49	1234	22.09	1256	22.71	1277	23.32	1299	23.94	—	—	—	—	—	—
16,000	1210	23.00	1231	23.62	1253	24.25	1274	24.88	1295	25.51	—	—	—	—	—	—	—	—	—	—
17,000	1255	25.99	1276	26.63	1296	27.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 59 — Fan Performance — 48AW,AY060 Units

48AW,AY060 (60 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	516	4.81	569	5.54	617	6.30	660	7.10	701	7.93	739	8.79	774	9.68	808	10.59	841	11.52	872	12.46
14,000	584	6.90	632	7.69	676	8.50	716	9.33	754	10.20	790	11.10	824	12.02	857	12.97	888	13.94	917	14.92
15,000	619	8.13	664	8.96	706	9.79	745	10.65	782	11.53	817	12.44	850	13.38	882	14.35	912	15.33	941	16.34
16,000	654	9.49	697	10.36	737	11.22	775	12.10	811	13.00	845	13.93	877	14.88	908	15.86	938	16.86	966	17.88
17,000	689	10.99	730	11.90	769	12.79	806	13.69	840	14.61	873	15.56	904	16.53	935	17.52	964	18.54	992	19.58
18,000	725	12.64	764	13.58	801	14.51	837	15.43	870	16.38	902	17.34	933	18.32	962	19.33	990	20.36	1018	21.41
19,000	760	14.43	798	15.41	834	16.37	868	17.32	900	18.29	932	19.27	961	20.27	990	21.29	1018	22.34	1045	23.40
20,000	796	16.37	833	17.39	867	18.39	900	19.37	931	20.36	962	21.36	991	22.38	1019	23.42	1046	24.48	1072	25.56
21,000	832	18.47	867	19.54	901	20.56	932	21.57	963	22.59	992	23.61	1020	24.65	1048	25.71	1074	26.78	1100	27.87
22,000	869	20.74	902	21.84	934	22.90	965	23.94	995	24.98	1023	26.03	1051	27.09	1077	28.17	1103	29.26	1129	30.36
23,000	905	23.17	937	24.31	968	25.40	998	26.48	1027	27.55	1055	28.62	1081	29.70	1107	30.79	1133	31.90	1157	33.02
24,000	942	25.78	973	26.95	1003	28.08	1032	29.18	1059	30.28	1086	31.38	1113	32.48	1138	33.59	1163	34.72	1187	35.86
25,000	978	28.56	1008	29.77	1037	30.93	1065	32.07	1092	33.20	1119	34.32	1144	35.44	1169	36.58	1193	37.72	—	—
26,000	1015	31.52	1044	32.76	1072	33.96	1099	35.13	1125	36.29	1151	37.44	1176	38.59	—	—	—	—	—	—
27,000	1052	34.66	1080	35.94	1107	37.18	1133	38.38	1159	39.57	1184	40.75	—	—	—	—	—	—	—	—

48AW,AY060 (60 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	901	13.42	930	14.38	958	15.36	985	16.34	1011	17.33	1036	18.33	1061	19.33	1085	20.34	1108	21.35	1131	22.36
14,000	946	15.92	974	16.94	1001	17.97	1027	19.01	1052	20.06	1077	21.12	1101	22.18	1125	23.25	1148	24.33	1170	25.42
15,000	970	17.36	997	18.40	1024	19.45	1049	20.51	1074	21.58	1099	22.67	1122	23.76	1146	24.86	1168	25.97	1191	27.08
16,000	994	18.93	1021	19.98	1047	21.05	1072	22.14	1097	23.23	1121	24.34	1144	25.45	1167	26.58	1190	27.71	—	—
17,000	1019	20.63	1045	21.70	1071	22.79	1096	23.89	1120	25.01	1144	26.13	1167	27.27	1190	28.42	—	—	—	—
18,000	1045	22.48	1070	23.57	1096	24.67	1120	25.79	1144	26.93	1167	28.07	1190	29.23	—	—	—	—	—	—
19,000	1071	24.49	1096	25.59	1121	26.71	1145	27.84	1169	28.99	1192	30.16	—	—	—	—	—	—	—	—
20,000	1098	26.66	1123	27.77	1147	28.90	1171	30.05	1194	31.21	—	—	—	—	—	—	—	—	—	—
21,000	1125	28.99	1150	30.12	1173	31.26	1197	32.42	—	—	—	—	—	—	—	—	—	—	—	—
22,000	1153	31.49	1177	32.63	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
23,000	1181	34.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
26,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
27,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND AND NOTES FOR TABLES 42-65.

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

Table 60 — Fan Performance — 50AW,AY020,025 Units

50AW,AY020,025 (20 THRU 25 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	394	1.06	409	1.13	473	1.47	530	1.82	581	2.18	629	2.55	673	2.93	714	3.31	752	3.70	789	4.10
5,000	388	1.26	445	1.57	504	1.93	557	2.30	606	2.68	651	3.07	694	3.47	734	3.88	772	4.29	808	4.71
6,000	421	1.72	485	2.12	540	2.52	590	2.92	636	3.32	679	3.73	719	4.15	757	4.57	794	5.00	829	5.44
7,000	471	2.38	528	2.80	580	3.24	627	3.67	670	4.10	711	4.53	749	4.97	786	5.41	821	5.86	855	6.31
8,000	522	3.19	573	3.64	621	4.10	666	4.56	707	5.02	746	5.48	783	5.94	818	6.40	852	6.87	884	7.34
9,000	575	4.16	621	4.63	666	5.11	708	5.60	747	6.09	784	6.58	820	7.07	853	7.56	886	8.05	917	8.54
10,000	629	5.30	671	5.79	712	6.30	751	6.81	789	7.32	824	7.84	858	8.35	891	8.87	922	9.38	952	9.90
11,000	683	6.62	723	7.14	761	7.66	797	8.19	832	8.73	866	9.27	899	9.81	930	10.35	960	10.89	989	11.43
12,000	739	8.12	776	8.67	811	9.21	845	9.76	878	10.32	910	10.88	941	11.45	971	12.01	1000	12.58	1028	13.14
13,000	794	9.82	829	10.40	862	10.97	893	11.53	925	12.11	955	12.69	985	13.28	1013	13.86	1041	14.45	1069	15.04
14,000	850	11.73	883	12.34	914	12.92	944	13.51	973	14.10	1002	14.70	1030	15.30	1057	15.91	1084	16.52	1111	17.13
15,000	906	13.85	938	14.48	967	15.09	995	15.70	1023	16.31	1050	16.92	1077	17.54	—	—	—	—	—	—

50AW,AY020,025 (20 THRU 25 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	823	4.50	856	4.90	887	5.30	917	5.71	946	6.12	974	6.53	1001	6.95	1027	7.36	1052	7.78	1076	8.21
5,000	843	5.14	876	5.57	908	6.00	938	6.44	968	6.88	996	7.32	1024	7.77	1050	8.22	1076	8.67	1101	9.12
6,000	863	5.88	896	6.34	927	6.79	958	7.25	987	7.71	1016	8.18	1043	8.65	1070	9.13	1096	9.60	1122	10.08
7,000	887	6.77	919	7.24	949	7.71	979	8.18	1008	8.66	1036	9.15	1063	9.64	1090	10.13	1116	10.63	1141	11.13
8,000	915	7.82	946	8.30	975	8.78	1004	9.27	1032	9.77	1059	10.27	1086	10.77	1112	11.28	1137	11.80	1162	12.31
9,000	947	9.03	976	9.53	1004	10.03	1032	10.54	1059	11.05	1085	11.56	1111	12.08	1136	12.60	1161	13.13	1186	13.66
10,000	981	10.42	1009	10.93	1037	11.45	1063	11.98	1089	12.50	1115	13.03	1140	13.56	1164	14.10	1188	14.64	—	—
11,000	1017	11.97	1045	12.51	1071	13.05	1097	13.60	1122	14.14	1147	14.69	1171	15.24	1195	15.79	—	—	—	—
12,000	1055	13.71	1082	14.27	1108	14.84	1133	15.40	1157	15.96	1181	16.53	—	—	—	—	—	—	—	—
13,000	1095	15.63	1121	16.22	1146	16.80	1170	17.39	1194	17.98	—	—	—	—	—	—	—	—	—	—
14,000	1136	17.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 102.

Table 61 — Fan Performance — 50AW,AY027,030 Units

50AW,AY027,030 (27 THRU 30 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	398	1.45	465	1.83	522	2.21	573	2.60	620	2.99	664	3.39	706	3.79	745	4.21	783	4.63	819	5.06
6,000	422	1.72	485	2.12	541	2.52	590	2.92	636	3.32	679	3.73	719	4.15	758	4.57	794	5.01	830	5.44
7,000	471	2.38	528	2.81	580	3.24	627	3.67	671	4.10	711	4.53	750	4.97	786	5.41	821	5.86	855	6.32
8,000	522	3.19	574	3.64	622	4.10	666	4.56	708	5.02	747	5.48	783	5.94	818	6.41	852	6.87	884	7.35
8,250	536	3.42	585	3.87	633	4.34	676	4.81	717	5.27	756	5.74	792	6.21	827	6.68	860	7.15	892	7.63
9,000	575	4.16	622	4.63	666	5.11	708	5.60	747	6.09	784	6.58	820	7.07	853	7.56	886	8.05	917	8.54
10,000	629	5.30	671	5.79	712	6.30	751	6.81	789	7.32	824	7.84	858	8.35	891	8.87	922	9.38	952	9.90
11,000	683	6.61	723	7.13	760	7.66	797	8.19	832	8.72	866	9.26	898	9.81	930	10.35	960	10.89	989	11.43
12,000	738	8.11	775	8.66	810	9.20	844	9.75	877	10.31	909	10.87	940	11.44	970	12.00	999	12.57	1028	13.13
13,000	793	9.80	828	10.38	861	10.95	892	11.51	924	12.09	954	12.67	984	13.26	1012	13.84	1040	14.43	1068	15.02
13,750	834	11.21	868	11.81	899	12.39	930	12.97	959	13.56	989	14.15	1017	14.75	1045	15.35	1072	15.96	1099	16.56
14,000	848	11.70	881	12.31	912	12.89	942	13.48	972	14.07	1000	14.67	1029	15.27	1056	15.88	1083	16.49	1109	17.10
15,000	904	13.80	936	14.44	965	15.05	993	15.66	1021	16.27	1048	16.88	1075	17.50	1101	18.13	1127	18.76	1152	19.38

50AW,AY027,030 (27 THRU 30 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,500	853	5.50	886	5.94	918	6.39	948	6.83	978	7.29	1006	7.74	1034	8.20	1061	8.66	1087	9.13	1112	9.59
6,000	864	5.89	896	6.34	928	6.79	958	7.25	988	7.72	1016	8.19	1044	8.66	1071	9.13	1097	9.61	1122	10.09
7,000	888	6.78	919	7.24	950	7.71	979	8.19	1008	8.67	1036	9.16	1064	9.65	1090	10.14	1116	10.64	1142	11.14
8,000	915	7.82	946	8.30	975	8.79	1004	9.28	1032	9.77	1059	10.27	1086	10.78	1112	11.29	1137	11.80	1162	12.32
8,250	923	8.11	953	8.59	982	9.08	1011	9.58	1038	10.08	1065	10.58	1092	11.09	1118	11.60	1143	12.12	1168	12.64
9,000	947	9.03	976	9.53	1004	10.03	1032	10.54	1059	11.05	1085	11.56	1111	12.08	1137	12.60	1161	13.13	1186	13.66
10,000	981	10.42	1009	10.93	1036	11.45	1063	11.98	1089	12.50	1115	13.03	1140	13.56	1164	14.10	1188	14.64	—	—
11,000	1017	11.97	1044	12.51	1071	13.05	1097	13.59	1122	14.14	1147	14.68	1171	15.23	1195	15.78	—	—	—	—
12,000	1055	13.70	1081	14.26	1107	14.83	1132	15.39	1157	15.95	1181	16.52	—	—	—	—	—	—	—	—
13,000	1094	15.61	1120	16.20	1145	16.78	1170	17.37	1193	17.96	—	—	—	—	—	—	—	—	—	—
13,750	1125	17.17	1150	17.77	1174	18.38	1198	18.98	—	—	—	—	—	—	—	—	—	—	—	—
14,000	1135	17.71	1160	18.32	1184	18.93	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15,000	1177	20.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 102.

Table 62 — Fan Performance — 50AW,AY035 Units

50AW,AY035 (35 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	537	2.87	588	3.31	634	3.74	677	4.17	717	4.60	755	5.04	792	5.48	827	5.93	860	6.39	893	6.85
8,000	592	3.81	638	4.27	682	4.73	722	5.19	760	5.65	796	6.11	831	6.58	864	7.05	896	7.52	927	8.00
9,000	648	4.91	691	5.40	731	5.89	769	6.38	805	6.87	840	7.36	872	7.84	904	8.34	934	8.83	964	9.33
10,000	705	6.20	744	6.71	782	7.23	818	7.74	852	8.26	885	8.77	916	9.29	946	9.80	976	10.32	1004	10.84
10,500	734	6.92	771	7.44	808	7.97	843	8.50	876	9.03	908	9.55	939	10.08	968	10.61	997	11.14	1025	11.66
11,000	762	7.69	799	8.22	834	8.76	868	9.30	900	9.84	932	10.38	962	10.92	991	11.46	1019	12.00	1046	12.54
12,000	821	9.38	854	9.93	887	10.49	919	11.05	950	11.61	980	12.18	1008	12.75	1036	13.31	1063	13.87	1090	14.44
13,000	879	11.28	911	11.85	941	12.43	971	13.01	1001	13.60	1029	14.18	1056	14.77	1083	15.36	1109	15.95	1135	16.54
14,000	938	13.40	968	13.99	996	14.59	1025	15.19	1052	15.80	1079	16.40	1106	17.02	1131	17.63	1156	18.24	1181	18.85
15,000	997	15.75	1025	16.36	1052	16.98	1079	17.59	1105	18.22	1131	18.85	1156	19.48	1180	20.11	1205	20.74	1228	21.38
16,000	1057	18.34	1083	18.97	1108	19.60	1134	20.24	1159	20.88	1183	21.53	1207	22.17	1231	22.83	1254	23.48	1277	24.13
17,000	1116	21.17	1141	21.82	1165	22.47	1189	23.12	1213	23.78	1236	24.44	1259	25.11	1282	25.78	—	—	—	—
17,500	1146	22.68	1170	23.34	1194	24.00	1217	24.66	1240	25.33	1263	26.00	1285	26.67	—	—	—	—	—	—

50AW,AY035 (35 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	924	7.31	954	7.79	984	8.26	1013	8.75	1041	9.23	1068	9.72	1094	10.22	1120	10.71	1146	11.21	1170	11.72
8,000	957	8.48	986	8.97	1014	9.46	1042	9.96	1069	10.46	1095	10.96	1121	11.48	1147	11.99	1171	12.51	1196	13.03
9,000	993	9.83	1021	10.33	1048	10.84	1075	11.35	1101	11.86	1126	12.38	1151	12.91	1176	13.44	1200	13.97	1223	14.51
10,000	1032	11.36	1058	11.88	1085	12.41	1110	12.93	1135	13.46	1160	14.00	1184	14.54	1207	15.08	1231	15.63	1254	16.18
10,500	1052	12.20	1078	12.73	1104	13.26	1129	13.80	1153	14.34	1178	14.88	1201	15.43	1225	15.98	1247	16.53	1270	17.09
11,000	1072	13.08	1098	13.62	1124	14.17	1148	14.72	1172	15.26	1196	15.82	1219	16.37	1242	16.93	1265	17.49	1287	18.05
12,000	1115	15.00	1140	15.57	1165	16.13	1188	16.70	1212	17.27	1235	17.84	1257	18.41	1279	18.98	—	—	—	—
13,000	1159	17.12	1183	17.71	1207	18.30	1230	18.89	1253	19.47	1275	20.06	1297	20.65	—	—	—	—	—	—
14,000	1205	19.46	1228	20.07	1251	20.68	1273	21.28	1295	21.90	—	—	—	—	—	—	—	—	—	—
15,000	1251	22.01	1274	22.64	1296	23.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16,000	1299	24.79	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 102.

Table 63 — Fan Performance — 50AW,AY040 Units

50AW,AY040 (40 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	499	2.88	546	3.27	590	3.66	632	4.06	672	4.46	711	4.87	748	5.28	784	5.70	819	6.14	853	6.58
9,000	548	3.78	591	4.20	631	4.62	670	5.04	708	5.47	744	5.90	778	6.33	812	6.77	845	7.22	877	7.67
10,000	599	4.86	637	5.30	675	5.74	711	6.19	746	6.64	779	7.09	812	7.55	844	8.01	875	8.47	905	8.94
11,000	649	6.11	685	6.57	720	7.04	753	7.51	786	7.99	817	8.47	848	8.94	878	9.43	907	9.91	936	10.40
12,000	701	7.54	734	8.03	766	8.52	797	9.02	828	9.52	857	10.02	886	10.52	915	11.03	943	11.53	970	12.04
13,000	753	9.18	783	9.69	813	10.21	842	10.72	871	11.25	899	11.77	927	12.30	953	12.82	980	13.35	1006	13.88
14,000	805	11.03	833	11.56	861	12.09	889	12.63	916	13.18	942	13.73	968	14.27	994	14.82	1019	15.37	1044	15.92
15,000	857	13.09	884	13.64	910	14.20	936	14.76	962	15.32	987	15.89	1011	16.46	1036	17.03	1060	17.61	1083	18.18
16,000	910	15.38	935	15.95	960	16.53	984	17.11	1008	17.69	1032	18.28	1056	18.87	1079	19.47	1101	20.06	1124	20.66
17,000	963	17.91	986	18.50	1010	19.09	1033	19.69	1056	20.30	1078	20.91	1101	21.52	1123	22.13	1145	22.75	1166	23.36
18,000	1016	20.68	1038	21.29	1060	21.90	1082	22.52	1104	23.15	1126	23.77	1147	24.41	1168	25.04	1189	25.67	1209	26.31
19,000	1069	23.71	1090	24.33	1111	24.96	1132	25.60	1153	26.25	1173	26.89	1194	27.54	1214	28.19	1234	28.85	—	—
20,000	1122	26.99	1142	27.64	1162	28.29	1182	28.95	—	—	—	—	—	—	—	—	—	—	—	—

50AW,AY040 (40 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	885	7.03	917	7.48	948	7.95	978	8.42	1007	8.90	1036	9.39	1063	9.88	1090	10.38	1116	10.88	1142	11.39
9,000	908	8.13	939	8.60	968	9.08	997	9.56	1026	10.05	1053	10.55	1080	11.05	1107	11.56	1133	12.08	1158	12.60
10,000	934	9.42	963	9.90	992	10.39	1020	10.89	1047	11.39	1073	11.89	1100	12.41	1125	12.93	1151	13.45	1175	13.99
11,000	964	10.89	992	11.39	1019	11.89	1045	12.40	1071	12.91	1097	13.43	1122	13.96	1147	14.49	1171	15.02	1195	15.56
12,000	996	12.55	1023	13.07	1048	13.59	1074	14.11	1099	14.64	1123	15.17	1147	15.71	1171	16.25	1195	16.80	1218	17.35
13,000	1031	14.41	1056	14.95	1081	15.48	1105	16.03	1129	16.57	1152	17.12	1175	17.67	1198	18.22	1221	18.78	1243	19.35
14,000	1068	16.48	1092	17.03	1115	17.59	1138	18.15	1161	18.71	1184	19.27	1206	19.84	1228	20.41	1250	20.99	1271	21.56
15,000	1106	18.75	1129	19.33	1151	19.91	1174	20.48	1196	21.07	1217	21.65	1239	22.23	1260	22.82	1280	23.41	—	—
16,000	1146	21.25	1168	21.85	1189	22.45	1211	23.04	1232	23.64	1253	24.25	1273	24.85	1293	25.45	—	—	—	—
17,000	1187	23.98	1208	24.60	1229	25.21	1249	25.83	1270	26.46	1289	27.07	—	—	—	—	—	—	—	—
18,000	1230	26.95	1250	27.58	1269	28.22	1289	28.86	—	—	—	—	—	—	—	—	—	—	—	—
19,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Legend and Notes on page 102.

Table 64 — Fan Performance — 50AW,AY050 Units

50AW,AY050 (50 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	509	2.95	555	3.35	599	3.74	640	4.14	680	4.54	718	4.95	755	5.36	791	5.79	826	6.22	859	6.66
9,000	558	3.87	600	4.29	640	4.71	678	5.13	715	5.56	751	5.99	786	6.42	819	6.87	852	7.31	884	7.77
10,000	608	4.96	646	5.40	683	5.85	719	6.30	754	6.75	787	7.20	819	7.66	851	8.12	882	8.58	912	9.06
11,000	659	6.23	694	6.69	728	7.16	762	7.64	794	8.11	825	8.59	856	9.07	886	9.55	915	10.04	943	10.53
12,000	710	7.68	743	8.17	775	8.67	806	9.17	836	9.67	866	10.17	895	10.67	923	11.17	950	11.68	978	12.19
13,000	763	9.35	793	9.86	823	10.37	852	10.89	880	11.42	908	11.94	935	12.47	962	12.99	988	13.52	1014	14.05
14,000	815	11.22	843	11.75	871	12.29	899	12.83	925	13.38	952	13.92	978	14.47	1003	15.02	1028	15.57	1052	16.12
15,000	868	13.31	895	13.86	921	14.42	946	14.98	972	15.55	997	16.12	1021	16.69	1045	17.26	1069	17.83	1092	18.41
16,000	921	15.64	946	16.21	971	16.78	995	17.37	1019	17.96	1043	18.54	1066	19.14	1089	19.73	1111	20.32	1134	20.92
17,000	974	18.20	998	18.79	1021	19.39	1044	19.99	1067	20.60	1089	21.21	1112	21.82	1134	22.43	1155	23.05	1176	23.66
18,000	1028	21.01	1050	21.62	1072	22.24	1094	22.86	1116	23.49	1137	24.12	1158	24.75	1179	25.38	1200	26.02	1220	26.65
19,000	1081	24.08	1103	24.71	1124	25.35	1145	25.99	1165	26.63	1185	27.28	1206	27.93	1226	28.58	1245	29.24	1265	29.90
20,000	1135	27.42	1155	28.06	1175	28.72	1195	29.38	1215	30.04	1234	30.71	1254	31.38	1273	32.05	1292	32.72	—	—

50AW,AY050 (50 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	892	7.12	923	7.57	954	8.04	984	8.52	1013	9.00	1041	9.49	1069	9.98	1095	10.48	1121	10.98	1147	11.49
9,000	915	8.23	945	8.70	975	9.18	1003	9.67	1032	10.16	1059	10.66	1086	11.16	1112	11.67	1138	12.19	1163	12.71
10,000	941	9.53	970	10.02	998	10.51	1026	11.00	1053	11.51	1080	12.01	1106	12.53	1131	13.05	1156	13.58	1181	14.11
11,000	971	11.02	999	11.52	1026	12.02	1052	12.53	1078	13.05	1103	13.57	1128	14.09	1153	14.63	1177	15.16	1201	15.71
12,000	1004	12.70	1030	13.22	1056	13.74	1081	14.26	1106	14.79	1130	15.33	1154	15.86	1178	16.41	1201	16.96	1224	17.51
13,000	1039	14.59	1064	15.12	1088	15.66	1113	16.20	1136	16.74	1160	17.29	1183	17.85	1206	18.40	1228	18.96	1250	19.53
14,000	1076	16.68	1100	17.23	1123	17.79	1147	18.35	1169	18.91	1192	19.48	1214	20.04	1236	20.62	1257	21.19	1279	21.77
15,000	1115	18.98	1138	19.56	1160	20.14	1182	20.72	1204	21.30	1226	21.88	1247	22.47	1268	23.05	1289	23.65	—	—
16,000	1156	21.52	1178	22.11	1199	22.71	1220	23.31	1241	23.91	1262	24.51	1282	25.12	—	—	—	—	—	—
17,000	1198	24.28	1218	24.90	1239	25.52	1259	26.14	1279	26.76	1299	27.38	—	—	—	—	—	—	—	—
18,000	1240	27.29	1260	27.93	1280	28.57	1300	29.21	—	—	—	—	—	—	—	—	—	—	—	—
19,000	1284	30.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 65 — Fan Performance — 50AW,AY060 Units

50AW,AY060 (60 TONS)

Cfm	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	490	4.48	543	5.17	591	5.88	634	6.61	674	7.37	711	8.14	746	8.94	779	9.76	811	10.60	841	11.45
14,000	554	6.41	602	7.17	645	7.94	686	8.72	723	9.51	759	10.33	792	11.16	824	12.01	855	12.88	884	13.76
15,000	586	7.56	632	8.34	674	9.14	713	9.94	749	10.77	784	11.60	816	12.45	848	13.32	878	14.21	906	15.11
16,000	619	8.83	663	9.64	703	10.46	741	11.30	776	12.14	810	13.00	841	13.87	872	14.76	901	15.66	929	16.58
17,000	652	10.23	694	11.07	733	11.92	769	12.78	803	13.65	836	14.53	867	15.42	897	16.33	926	17.25	953	18.19
18,000	685	11.76	725	12.63	763	13.51	798	14.39	831	15.29	863	16.20	893	17.11	922	18.04	950	18.98	978	19.93
19,000	719	13.44	757	14.33	793	15.23	827	16.14	860	17.07	890	18.00	920	18.94	949	19.88	976	20.84	1003	21.81
20,000	753	15.26	789	16.18	824	17.10	857	18.04	888	18.99	918	19.94	947	20.90	975	21.87	1002	22.85	1028	23.84
21,000	787	17.23	822	18.17	855	19.12	887	20.08	918	21.05	947	22.03	975	23.02	1002	24.01	1029	25.01	1054	26.02
22,000	821	19.35	855	20.32	887	21.29	918	22.28	947	23.28	976	24.28	1003	25.28	1030	26.30	1056	27.32	1081	28.35
23,000	855	21.63	888	22.62	919	23.62	949	24.63	977	25.65	1005	26.68	1032	27.71	1058	28.75	1083	29.79	1108	30.85
24,000	889	24.07	921	25.08	951	26.11	980	27.14	1008	28.19	1035	29.24	1061	30.29	1086	31.35	1111	32.42	1135	33.49
25,000	924	26.67	954	27.71	983	28.76	1011	29.82	1038	30.89	1065	31.96	1090	33.04	1115	34.12	1139	35.21	1163	36.31
26,000	958	29.45	987	30.51	1016	31.59	1043	32.67	1069	33.76	1095	34.85	1120	35.95	1144	37.06	1168	38.17	1191	39.29
27,000	993	32.40	1021	33.49	1048	34.58	1075	35.69	1101	36.80	1126	37.92	1150	39.04	1174	40.17	1197	41.30	—	—

50AW,AY060 (60 TONS) (cont)

Cfm	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	870	12.33	898	13.22	925	14.13	951	15.06	977	16.00	1002	16.96	1026	17.92	1049	18.90	1072	19.89	1094	20.89
14,000	912	14.67	939	15.59	965	16.52	991	17.47	1016	18.44	1040	19.42	1063	20.41	1086	21.41	1109	22.43	1131	23.46
15,000	934	16.02	961	16.96	987	17.90	1012	18.87	1036	19.84	1060	20.83	1083	21.84	1106	22.85	1128	23.88	1150	24.92
16,000	957	17.51	983	18.46	1008	19.42	1033	20.39	1057	21.38	1081	22.39	1104	23.40	1126	24.43	1148	25.47	1170	26.52
17,000	980	19.13	1006	20.10	1031	21.07	1055	22.06	1079	23.06	1102	24.07	1125	25.10	1147	26.14	1169	27.19	1190	28.26
18,000	1004	20.89	1029	21.87	1054	22.86	1078	23.86	1101	24.88	1124	25.91	1147	26.94	1169	28.00	1190	29.06	—	—
19,000	1028	22.80	1053	23.79	1078	24.80	1101	25.81	1124	26.84	1147	27.89	1169	28.94	1190	30.00	—	—	—	—
20,000	1053	24.85	1078	25.86	1102	26.88	1125	27.91	1148	28.96	1170	30.01	1192	31.08	—	—	—	—	—	—
21,000	1079	27.04	1103	28.07	1126	29.11	1149	30.16	1172	31.22	1194	32.30	—	—	—	—	—	—	—	—
22,000	1105	29.39	1129	30.44	1152	31.50	1174	32.57	1196	33.65	—	—	—	—	—	—	—	—	—	—
23,000	1131	31.90	1155	32.97	1177	34.05	1199	35.13	—	—	—	—	—	—	—	—	—	—	—	—
24,000	1158	34.57	1181	35.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25,000	1186	37.41	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
26,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
27,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND AND NOTES FOR TABLES 42-65.

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

Table 66 — Motor Limitations

HIGH-EFFICIENCY MOTORS								
Nominal		Maximum		Maximum Amps			Maximum Watts	Maximum Efficiency
Bhp	BkW	Bhp	BkW	230 v	460 v	575 v		
5	3.73	5.9	4.40	14.6	7.9	6.0	5,030	87.5
7.5	5.6	8.7	6.49	22	—	—	7,717	84.1
		9.5	7.09	—	12.0	10.0	8,008	88.5
10	7.46	10.2	7.61	28	—	—	9,502	89.5
		11.8	8.80	—	14.6	12.0	9,836	89.5
15	11.19	15.3	11.41	43.8	—	—	12,543	91.0
		18.0	13.43	—	21.9	19.0	14,756	91.0
20	14.92	22.4	16.71	62	—	—	18,363	91.0
		23.4	17.46	—	28.7	23.0	19,183	91.0
25	18.65	28.9	21.56	72	—	—	23,511	91.7
		29.4	21.93	—	37.4	31.0	23,918	91.7
30	22.38	35.6	26.56	95	—	—	28,742	92.4
		34.7	25.89	—	48.0	47.0	28,015	92.4
40	29.84	42.0	31.33	110	55.0	48.8	33,690	93.0

PREMIUM-EFFICIENCY MOTORS							
Nominal		Maximum		Maximum Amps		Maximum Watts	Maximum Efficiency
Bhp	BkW	Bhp	BkW	230 v	460 v		
5	3.73	5.9	4.40	15.8	7.9	4,918	89.5
7.5	5.6	8.7	6.49	22	—	7,078	91.7
		9.5	7.09	—	12.0	7,728	91.7
10	7.46	10.2	7.61	28	—	8,298	91.0
		11.8	8.80	—	15.0	9,600	91.7
15	11.19	15.3	11.41	43.8	—	12,273	91.7
		18.0	13.43	—	21.9	14,439	93.0
20	14.92	22.4	16.71	58.2	—	17,853	93.0
		23.4	17.46	—	28.7	18,650	93.6
25	18.65	28.9	21.56	73	—	23,034	93.6
		29.4	21.93	—	36.3	23,432	93.6
30	22.38	35.6	26.56	82.6	—	28,374	93.6
		34.7	25.89	—	41.7	27,656	93.6
40	29.84	42.0	31.33	110.0	55.0	33,156	94.5

LEGEND

Bhp — Brake Horsepower
BkW — Brake Kilowatts

NOTES:
1. Extensive motor and electrical testing on the Carrier units has ensured that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown in the Motor Limitations table will not result in nuisance tripping or premature motor failures. Unit warranty will not be affected.
2. All motors comply with Energy Policy Act (EPACT) Standards effective October 24, 1997.

Table 67 — Air Quantity Limits

UNIT 48AJ,AK,AW,AY	MINIMUM HEATING AIRFLOW CFM (Low Heat)	MINIMUM HEATING AIRFLOW CFM (High Heat)	MINIMUM COOLING AIRFLOW (VAV) CFM AT FULL LOAD	MINIMUM COOLING AIRFLOW CFM (CV)	MAXIMUM AIRFLOW CFM
020	5,900	6,100	4,000	6,000	10,000
025	5,900	6,100	5,000	7,500	12,500
027	5,900	6,100	5,400	8,100	13,500
030	5,900	6,100	6,000	9,000	15,000
035	5,900	6,100	7,000	10,500	17,500
040	7,600	10,100	8,000	12,000	20,000
050	7,600	10,100	10,000	15,000	22,500
060	11,000	10,100	12,000	18,000	27,000

LEGEND

CV — Constant Volume
VAV — Variable Air Volume

NOTE: Variable Air Volume units will operate down to 70 cfm/ton in Cooling Mode. Performance at 70 cfm/ton is limited to unloaded operation and may be also limited by edb (entering dry bulb) and ewb (entering wet bulb) conditions.

SERVICE

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

Service Access — All unit components can be reached through clearly labelled hinged access doors. These doors are not equipped with tiebacks, so if heavy duty servicing is needed, either remove them or prop them open to prevent accidental closure.

Each door is held closed with 3 latches. The latches are secured to the unit with a single $^1/_4$-in. - 20 x $^1/_2$-in. long bolt. See Fig. 28.

To open, loosen the latch bolt using a $^7/_{16}$-in. wrench. Pivot the latch so it is not in contact with the door. Open the door. To shut, reverse the above procedure.

NOTE: Disassembly of the top cover may be required under special service circumstances. It is very important that the orientation and position of the top cover be marked on the unit prior to disassembly. This will allow proper replacement of the top cover onto the unit and prevent rainwater from leaking into the unit.

IMPORTANT: After servicing is completed, make sure door is closed and relatched properly, and that the latches are tight. Failure to do so can result in water leakage into the evaporator section of the unit.

Cleaning — Inspect unit interior at beginning of each heating and cooling season and as operating conditions require. Remove unit side panels and/or open doors for access to unit interior.

MAIN BURNERS — At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust if necessary. Check spark gap. See Fig. 29. Refer to Main Burners section on page 107.

FLUE GAS PASSAGEWAYS — The flue collector box and heat exchanger cells may be inspected by removing gas section access panel, flue box cover, collector box, and main burner assembly (Fig. 30 and 31). Refer to Main Burners section on page 107 for burner removal sequence. If cleaning is required, clean all parts with a wire brush. Reassemble using new high-temperature insulation for sealing.

COMBUSTION-AIR BLOWER — Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bi-monthly to determine proper cleaning frequency.

To inspect blower wheel, remove heat exchanger access panel. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel assembly by removing screws holding motor mounting plate to top of combustion fan housing (Fig. 30 and 31). The motor, scroll, and wheel assembly can be removed from the unit. Remove scroll from plate. Remove the blower wheel from the motor shaft and clean with a detergent or solvent. Replace motor and wheel assembly.

EVAPORATOR COIL — Remove access panels and clean as required with commercial coil cleaner.

CONDENSER COIL — Clean condenser coil annually and as required by location and outdoor-air conditions. Inspect coil monthly; clean as required.

CONDENSATE DRAIN — Check and clean each year at start of cooling season. In winter, keep drains and traps dry.

FILTERS — Clean or replace at start of each heating and cooling season, or more often if operating conditions require. Refer to Installation Instructions for type and size.

NOTE: The unit requires industrial grade throwaway filters capable of withstanding face velocities up to 625 fpm.

OUTDOOR-AIR INLET SCREENS — Clean screens with steam or hot water and a mild detergent. Do not use disposable filters in place of screens.

Lubrication

FAN SHAFT BEARINGS — Lubricate bearings at least every 6 months with suitable bearing grease. Do not over grease. Typical lubricants are given below:

MANUFACTURER	LUBRICANT
Texaco	Regal AFB-2*
Mobil	Mobilplex EP No. 1
Sunoco	Prestige 42
Texaco	Multifak 2

*Preferred lubricant because it contains rust and oxidation inhibitors.

CONDENSER- AND EVAPORATOR-FAN MOTOR BEARINGS — The condenser- and evaporator-fan motors have permanently sealed bearings, so no field lubrication is necessary.

Evaporator Fan Performance Adjustment (Fig. 32) — Fan motor pulleys are designed for speed shown in Physical Data table in unit Installation Instructions (factory speed setting).

IMPORTANT: Check to ensure that the unit drive matches the duct static pressure using Tables 42-65.

To change fan speeds, change pulleys.

To align fan and motor pulleys:

1. Shut off unit power supply.
2. Loosen fan shaft pulley bushing.
3. Slide fan pulley along fan shaft.
4. Make angular alignment by loosening motor from mounting plate.
5. Retighten pulley.
6. Return power to the unit.

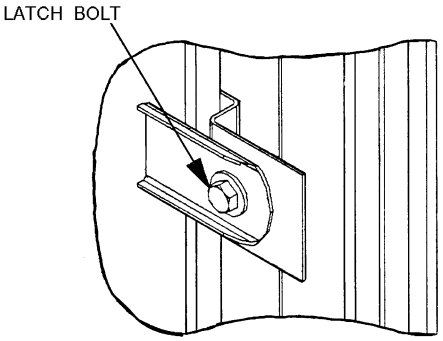


Fig. 28 — Door Latch

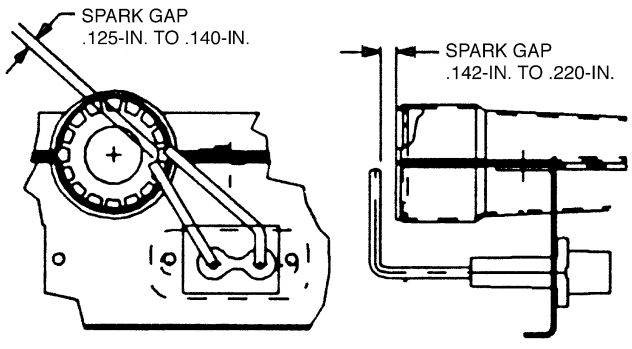
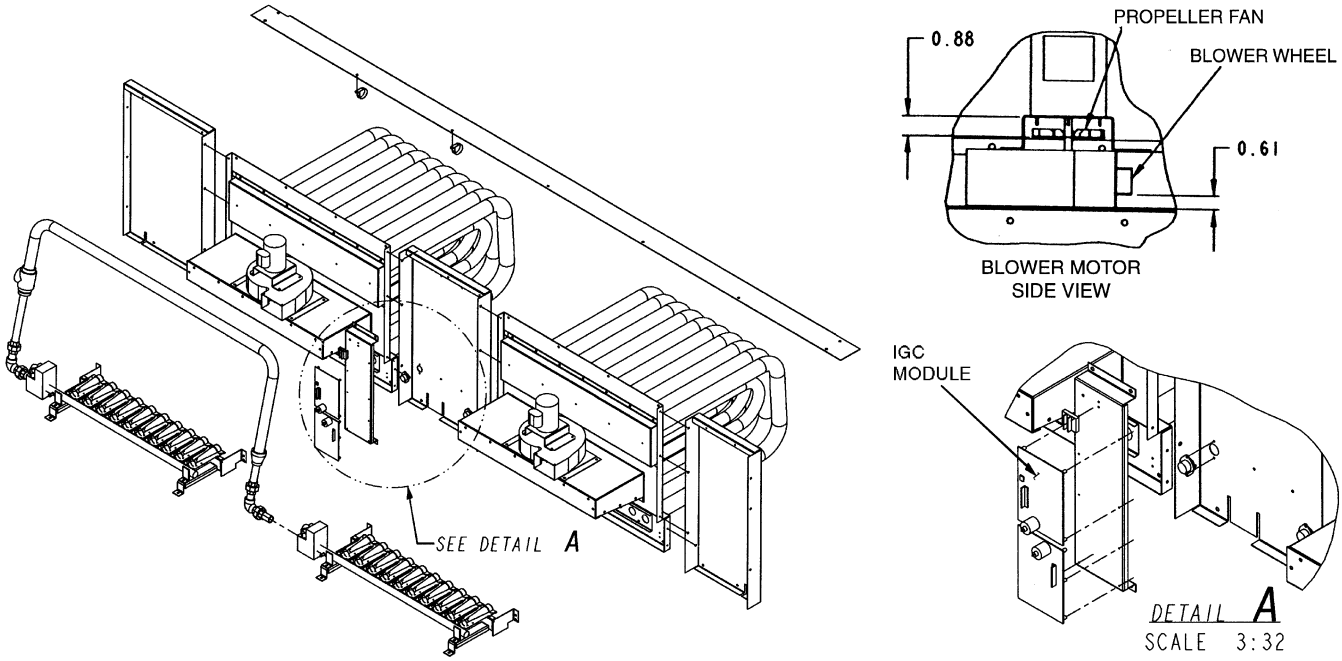


Fig. 29 — Spark Gap Adjustment



NOTES:
1. Torque set screws on blower wheel to 70 in. lb ± 2 in. lb.
2. Torque set screw on propeller fan to 15 in. lb ± 2 in. lb.
3. Dimensions are in inches.

Fig. 30 — Typical Gas Heating Section

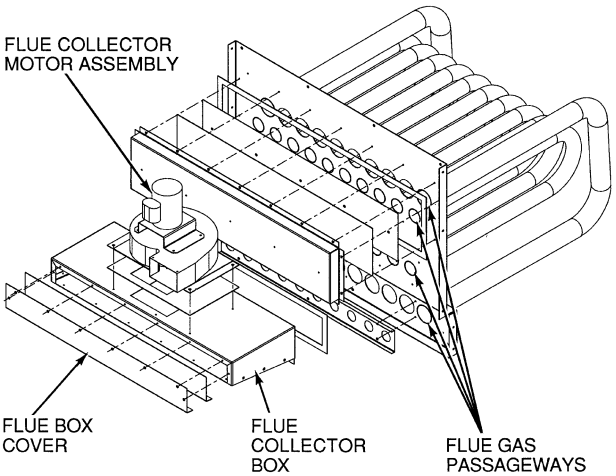


Fig. 31 — Gas Heat Section Details

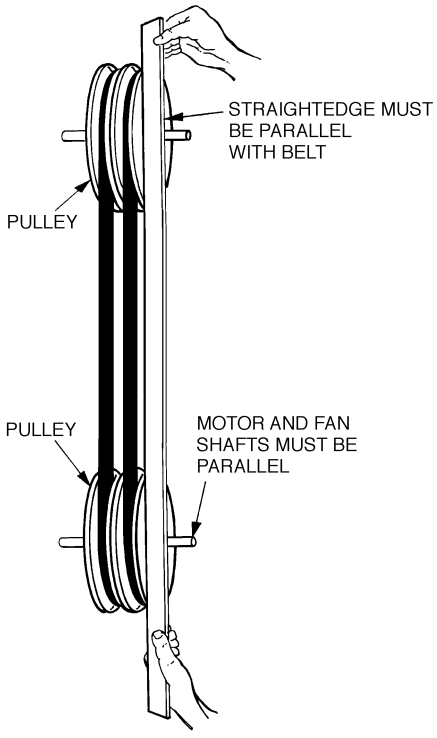


Fig. 32 — Evaporator-Fan Alignment and Adjustment

Evaporator Fan Coupling Assembly — If the coupling has been removed for other blower assembly component repair or replacement, it is critical that the coupling be reassembled and aligned correctly to prevent premature failures.

REASSEMBLING THE COUPLING INTO THE UNIT (Fig. 33)

1. Prior to reassembling the coupling, loosen the 4 bearing mounting bolts, which secure the 2 bearings on either side of the coupling. Remove the drive belts.
2. Reassemble the coupling with the bearings loose. This allows the coupling to find its own self-alignment position.
3. Check the hub-to-shaft fit for close fitting clearances. Replace hubs if high clearances are determined.
4. Check the key for close-fitted clearances on the sides and 0.015 in. clearance over the top of the key. Replace key if necessary.
5. Be sure that hub flanges, flex members, spacer, and hardware are clean and free of oil.
6. Place the flanges onto the shafts with the hub facing outward. Do not tighten the set screws at this time.
7. Outside of the unit, assemble the flex members to the center drive shaft with 4 bolts and nuts. The flex members have collars that need to be inserted into the smaller hole of the drive shaft flange.
8. Assemble the flex member/drive shaft assembly to one of the shaft flanges, using 2 bolts and nuts. Slide the other shaft flange towards the assembly and assemble using 2 bolts and nuts. If the shafts are not misaligned, the collar in the flex member should line up with the shaft flange holes.
9. Torque nuts properly to 95 to 100 ft-lb. Do not turn a coupling bolt. Always turn the nut. Always use thread lubricant or anti-seize compound to prevent thread galling.
10. The ends of the shafts should be flush with the inside of the shaft flange. Torque the set screws to 25 ft-lb.
11. After assembly is complete, slowly rotate the shafts by hand for 30 to 60 seconds.
12. Tighten the bearing mounting bolts, using care not to place any loads on the shaft which would cause flexure to the shafts.
13. Reinstall drive belts. (Refer to Belt Tension Adjustment section below.)
14. Visually inspect the assembly. If the shafts are overly misaligned, the drive shaft flange will not be parallel with the shaft flanges.
15. Recheck nut torque after 1 to 2 hours of operation. Bolts tend to relax after being initially torqued.

Evaporator Fan Service and Replacement

1. Turn off unit power supply.
2. Remove supply-air section panels.
3. Remove belt and blower pulley.
4. Loosen setscrews in blower wheels.
5. Remove locking collars from bearings.
6. Remove shaft.
7. Remove venturi on opposite side of bearing.
8. Lift out wheel.
9. Reverse above procedure to reinstall fan.
10. Check and adjust belt tension as necessary.
11. Restore power to unit.

Belt Tension Adjustment — To adjust belt tension:

1. Turn off unit power supply.
2. Loosen motor mounting nuts and bolts. See Fig. 34.
3. Loosen fan motor nuts.
4. Turn motor jacking bolts to move motor mounting plate left or right for proper belt tension. A slight bow should be present in the belt on the slack side of the drive while running under full load.
5. Tighten nuts.
6. Adjust bolts and nut on mounting plate to secure motor in fixed position. Recheck belt tension after 24 hours of operation. Adjust as necessary. Refer to Installation Instructions for proper tension values.
7. Restore power to unit.

Evaporator-Fan Motor Replacement

1. Turn off unit power supply.
2. Remove upper outside panel and open hinged door to gain access to motor.
3. Fully retract motor plate adjusting bolts.
4. Loosen the 2 rear (nearest the evaporator coil) motor plate nuts.
5. Remove the 2 front motor plate nuts and carriage bolts.
6. Slide motor plate to the rear (toward the coil) and remove fan belt(s).
7. Slide motor plate to the front and hand tighten one of the rear motor plate nuts (tight enough to prevent the motor plate from sliding back but loose enough to allow the plate to pivot upward).
8. Pivot the front of the motor plate upward enough to allow access to the motor mounting hex bolts and secure in place by inserting a prop.
9. Remove the nuts from the motor mounting hex bolts and remove motor.
10. Reverse above steps to install new motor.

Condenser-Fan Adjustment

1. Turn off unit power supply.
2. Remove fan guard.
3. Loosen fan hub setscrews.
4. Adjust fan height on shaft using a straightedge placed across venturi and measure per Fig. 35.
5. Fill hub recess with permagum if rubber hubcap is missing.
6. Tighten setscrews and replace panel(s).
7. Turn on unit power.

Power Failure — The economizer damper motor is a spring return design. In event of power failure, dampers will return to fully closed position until power is restored.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate. Refer to Carrier GTAC II; Module 5; Charging, Recovery, Recycling, and Reclamation section for charging methods and procedures.

Unit panels must be in place when unit is operating during charging procedure.

NOTE: Do not use recycled refrigerant as it may contain contaminants.

NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant from the unit nameplate.

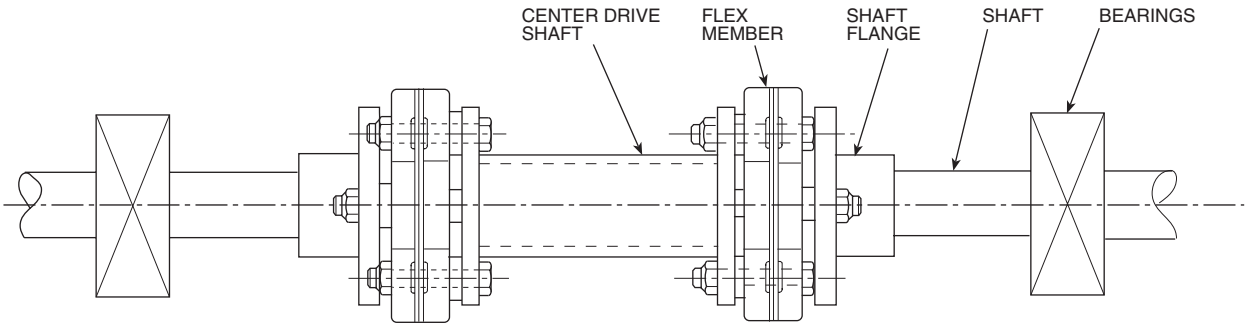


Fig. 33 — Evaporator Fan Coupling

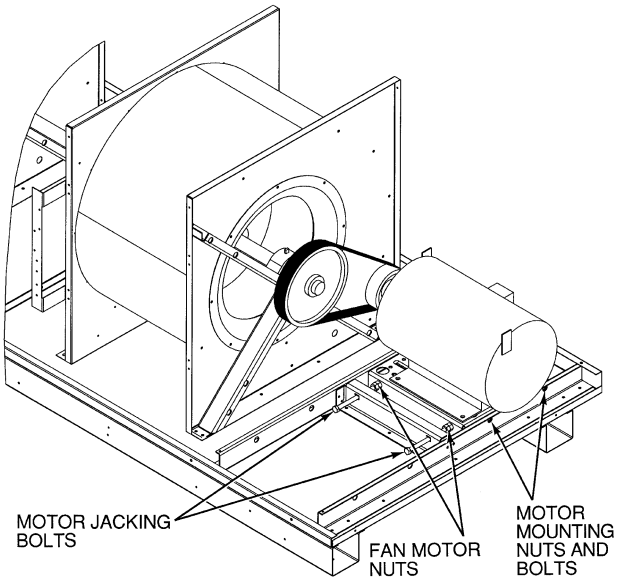


Fig. 34 — Belt Tension Adjustment

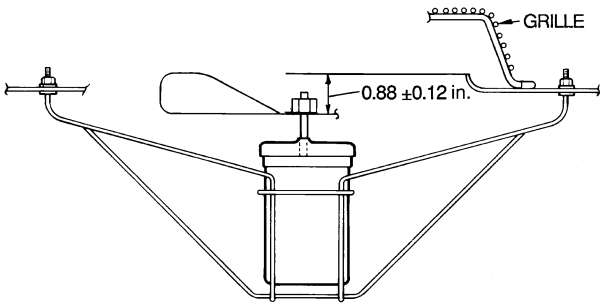


Fig. 35 — Condenser-Fan Adjustment

LOW CHARGE COOLING — Connect the gage set and a temperature measuring device to the liquid line. Ensure that all condenser fans are operating. It may be necessary to block part of the coil on cold days to ensure that condensing pressures are high enough to turn on the fans. Adjust the refrigerant change in each circuit to obtain 20 F ± 2 F of liquid subcooling.

NOTE: Indoor-air cfm must be within normal operating range of unit.

Thermostatic Expansion Valve (TXV) — Each circuit has a TXV. The TXV is nonadjustable and is factory set to maintain 10 to 13° F superheat leaving the evaporator coil. The TXV controls flow of liquid refrigerant to the evaporator coils.

Gas Valve Adjustment

NATURAL GAS — The 2-stage gas valve opens and closes in response to the thermostat or limit control.

When power is supplied to valve terminals 3 and 4, the pilot valve opens to the preset position. When power is supplied to terminals 1 and 2, the main valve opens to its preset position.

The regular factory setting is stamped on the valve body (3.5 in. wg).

To adjust regulator:

1. Set thermostat at setting for no call for heat.
2. Turn main gas valve to OFF position.
3. Remove $^1/_8$-in. pipe plug from manifold. Install a water manometer pressure-measuring device.
4. Set main gas valve to ON position.
5. Set thermostat at setting to call for heat (high fire).
6. Remove screw cap covering regulator adjustment screw (See Fig. 36).
7. Turn adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure.
8. Once desired pressure is established, set unit to no call for heat (3.3-in. wg high fire).
9. Turn main gas valve to OFF position.
10. Remove pressure-measuring device and replace $^1/_8$-in. pipe plug and screw cap.
11. Turn main gas valve to ON position and check heating operation.

Main Burners — For all applications, main burners are factory set and should require no adjustment.

MAIN BURNER REMOVAL (Fig. 37)

1. Shut off (field-supplied) manual main gas valve.
2. Shut off power supply to unit.
3. Remove heating access panel.
4. Disconnect gas piping from gas valve inlet.
5. Remove wires from gas valve.
6. Remove wires from rollout switch.
7. Remove sensor wire and ignitor cable from IGC board.
8. Remove 2 screws securing manifold bracket to basepan.
9. Remove 4 screws that hold the burner support plate flange to the vestibule plate.
10. Lift burner assembly out of unit.
11. Reverse procedure to re-install burners.

Filter Drier — Replace whenever refrigerant system is exposed to atmosphere.

Replacement Parts — A complete list of replacement parts may be obtained from any Carrier distributor upon request.

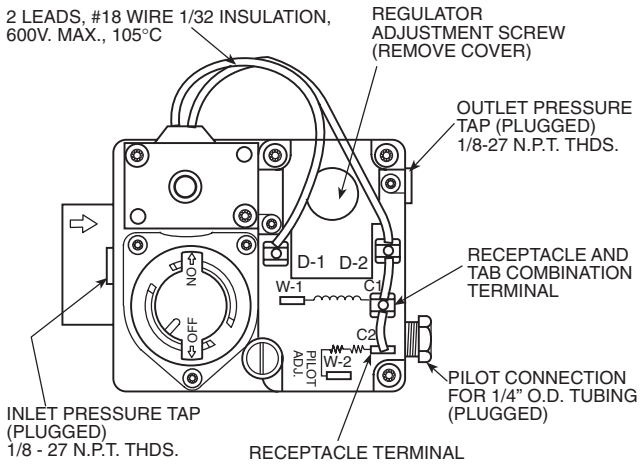


Fig. 36 — Gas Valve (Part Number EF33CB271)

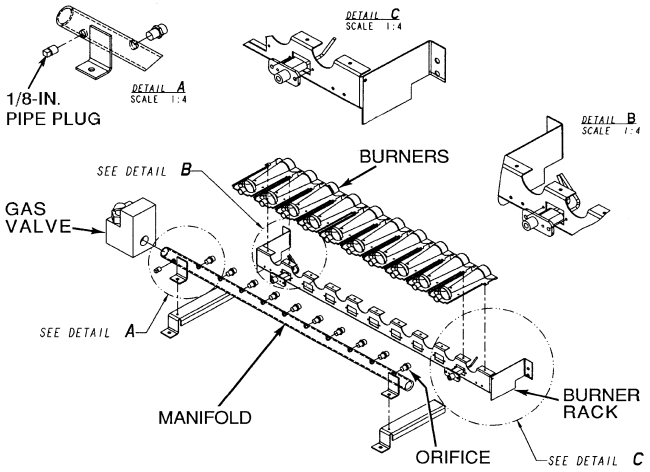


Fig. 37 — Main Burner Removal

TROUBLESHOOTING

The Scrolling Marquee display shows the actual operating conditions of the unit while it is running. If there are alarms or there have been alarms, they will be displayed in either the current alarm list or the history alarm list. The Service Test mode allows proper operation of the compressors, fans, and other components to be checked while the unit is not operating.

Complete Unit Stoppage — There are several conditions that can cause the unit not to provide heating or cooling. If an alarm is active which causes the unit to shut down, diagnose the problem using the information provided in Table 41, but also check for the following:

- Cooling and heating loads are satisfied.
- Programmed schedule.
- General power failure.
- Tripped control circuit transformers circuit breakers.
- Tripped compressor circuit breakers.
- Unit is turned off through the CCN network.

Single Circuit Stoppage — If a single circuit stops incorrectly, there are several possible causes. The problem should be investigated using information from the Alarm and Alert list See Table 41.

Service Analysis — Detailed service analysis can be found in Tables 68-70 and in Fig. 38.

Restart Procedure — Before attempting to restart the machine, check the alarm list to determine the cause of the shutdown. If the shutdown alarm for a particular circuit has occurred, determine and correct the cause before allowing the unit to run under its own control again. When there is problem, the unit should be diagnosed in Service Test mode. The alarms must be reset before the circuit can operate in either Normal mode or Service Test mode.

Thermistor Troubleshooting — The electronic control uses five 5K-thermistors for the saturated condensing temperature sensor SCT.A and SCT.B. See Tables 71 and 72 for temperature vs. resistance data.

When replacing thermistors SDT.A and SDT.B, reuse the original hardware. These thermistors must be clamped tightly to the hairpins of the condenser.

The EDT, OAT, RAT, LAT, T55, T56, and T58 space temperature sensors use 10K thermistors. Resistances at various temperatures are listed in Tables 73 and 74.

THERMISTOR/TEMPERATURE SENSOR CHECK — A high quality digital volt-ohmmeter is required to perform this check.

1. Connect the digital voltmeter across the appropriate thermistor terminals at the J8 terminal strip on the Main Base Board (see Fig. 1).
2. Using the voltage reading obtained, read the sensor temperature from Tables 71-74.
3. To check thermistor accuracy, measure temperature at probe location with an accurate thermocouple-type temperature-measuring instrument. Insulate thermocouple to avoid ambient temperatures from influencing reading. Temperature measured by thermocouple and temperature determined from thermistor voltage reading should be close, 5 F (3 C) if care was taken in applying thermocouple and taking readings.

If a more accurate check is required, unit must be shut down and thermistor removed and checked at a known temperature (freezing point or boiling point of water) using either voltage drop measured across thermistor at the J8 terminal, or by determining the resistance with unit shut down and thermistor disconnected from J8. Compare the values determined with the value read by the control in the Temperatures mode using the Scrolling Marquee display.

Transducer Troubleshooting — The electronic control uses 3 suction pressure transducers to measure the suction pressure of circuits A, B, and C. The pressure/voltage characteristics of these transducers are in shown in Table 75. The accuracy of these transducers can be verified by connecting an accurate pressure gage to the second refrigerant port in the suction line.

Table 68 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and Fan Will Not Start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped. Check CB1, CB2, and CB3.	Replace fuse or reset circuit breaker.
	Disconnect off.	Power disconnect.
	Compressor time guard to prevent short cycling.	Check using *Comfort*Link™ Scrolling Marquee.
	Thermostat or occupancy schedule set point not calling for Cooling.	Check using *Comfort*Link Scrolling Marquee.
	Outdoor temperature too low.	Check Compressor Lockout Temperature (MC.LO) using *Comfort*Link Scrolling Marquee.
	Active alarm.	Check active alarms using *Comfort*Link Scrolling Marquee.
Compressor Cycles (Other Than Normally Satisfying Thermostat).	Insufficient line voltage.	Determine cause and correct.
	Active alarm.	Check active alarms using *Comfort*Link *S*crolling Marquee.
Compressors Operates Continuously.	Unit undersized for load.	Decrease load or increase of size of unit.
	Thermostat or occupancy schedule set point too low.	Reset thermostat or schedule set point.
	Dirty air filters.	Replace filters.
	Low refrigerant charge.	Check pressure, locate leak, repair evacuate, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive Head Pressures.	Loose condenser thermistors.	Tighten thermistors.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharge.	Recover excess refrigerant.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line and insulate. 2. Replace TXV (and filter drier) if stuck open or closed.
	Condenser air restricted or air short cycling.	Determine cause and correct.
	Restriction in liquid tube.	Remove restriction.
Condenser Fans Not Operating.	No Power to contactors.	Fuse blown or plug at motor loose.
Excessive Suction Pressure.	High heat load.	Check for sources and eliminate
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line and insulate. 2. Replace TXV (and filter drier) if stuck open or closed.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction Pressure Too Low.	Dirty air filters.	Replace air filters.
	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line and insulate. 2. Replace TXV (and filter drier) if stuck open or closed.
	Insufficient evaporator airflow.	Check belt tension. Check for other restrictions.
	Temperature too low in conditioned area (low return-air temperature).	Reset thermostat or occupancy schedule.

LEGEND

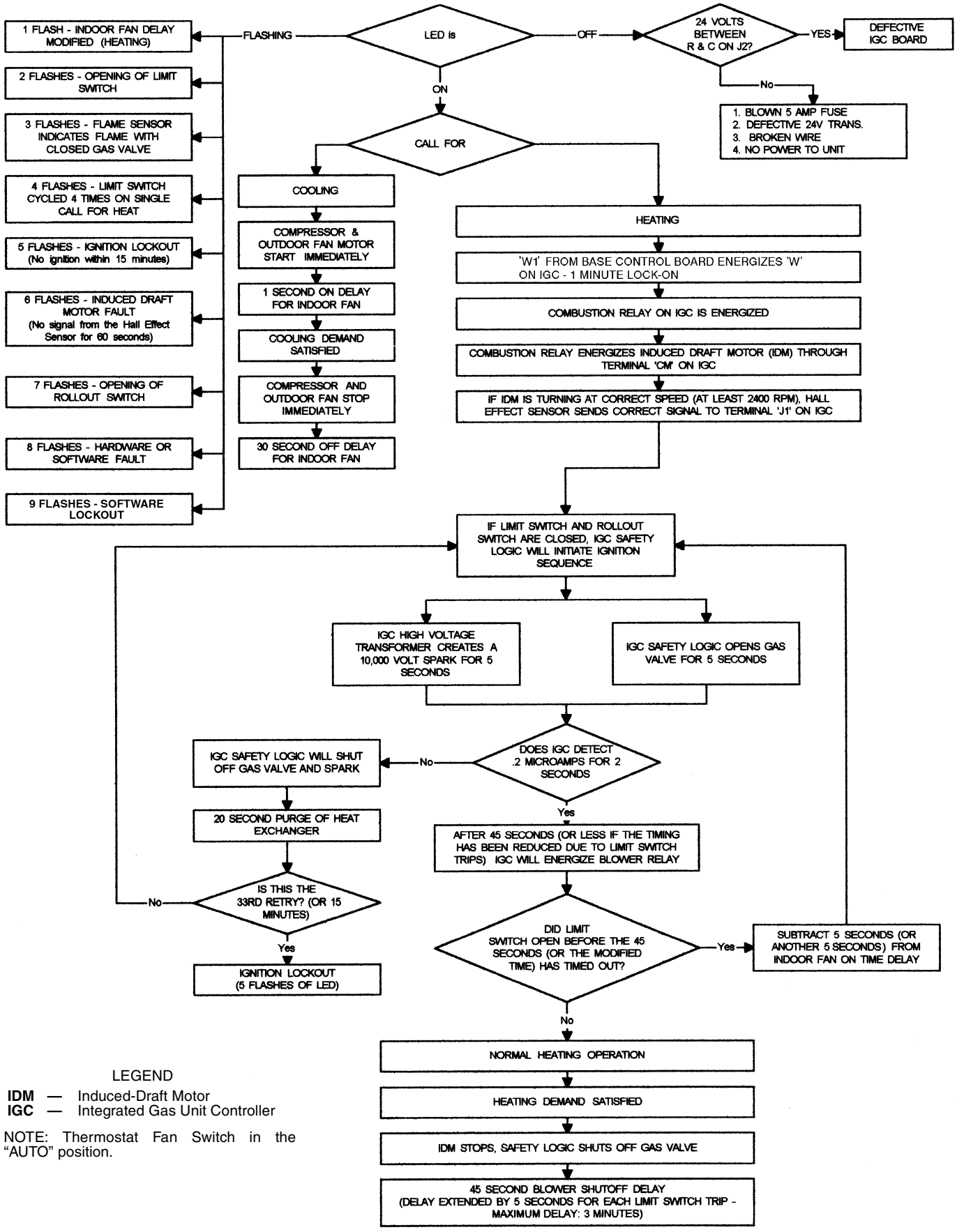
CB — Circuit Breaker
TXV — Thermostatic Expansion Valve

Table 69 — Gas Heating Service Analysis

PROBLEM	CAUSE	REMEDY
Burners Will Not Ignite.	Active alarm.	Check active alarms using *Comfort*Link™ Scrolling Marquee.
	No power to unit.	Check power supply, fuses, wiring, and circuit breakers.
	No power to IGC (Integrated Gas Control).	Check fuses and plugs.
	Heaters off due to time guard to prevent short cycling.	Check using *Comfort*Link Scrolling Marquee.
	Thermostat or occupancy schedule set point not calling for Cooling.	Check using *Comfort*Link Scrolling Marquee.
	No gas at main burners.	Check gas line for air and purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to re-light unit.
	Water in gas line.	Drain water and install drip.
Inadequate Heating.	Dirty air filters.	Replace air filters.
	Gas input too low.	Check gas pressure at manifold. Refer to gas valve adjustment in Installation, Start-up, and Service Manual.
	Thermostat or occupancy schedule set point only calling for W1.	Allow time for W2 to energize.
	Unit undersized for load.	Decrease load or increase of size of unit.
	Restricted airflow.	Remove restriction.
	Too much outdoor air.	Check economizer position and configuration. Adjust minimum position using *Comfort*Link Scrolling Marquee.
	Limit switch cycles main burners.	Check rotation of blower, thermostat heat anticipator settings, and temperature rise of unit. Adjust as needed.
Poor Flame Characteristics.	Incomplete combustion (lack of combustion air) results in: Aldehyde odors, CO, sooting flame, or floating flame.	Check all screws around flue outlets and burner compartment. Tighten as necessary.
		Cracked heat exchanger, replace.
		Unit is over-fired, reduce input. Adjust gas line or manifold pressure.
		Check vent for restriction. Clean as necessary.
		Check orifice to burner alignment.
Burners Will Not Turn Off.	Unit is in Minimum on-time.	Check using *Comfort*Link Scrolling Marquee.
	Unit running in Service Test Mode.	Check using *Comfort*Link Scrolling Marquee.

Table 70 — Electric Heat Service Analysis

PROBLEM	CAUSE	REMEDY
No Heat.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped. Check CB1, CB2, and CB3.	Replace fuse or reset circuit breaker.
	Thermostat occupancy schedule set point not calling for Heating.	Check using *Comfort*Link Scrolling Marquee.
	No 24 VAC at primary contactor.	Check transformer and circuit breaker.
	No power (high voltage) to L2 of primary contactor.	Check safety switches “one-shot” backup and auto limit.
	Bad electrical elements.	Power off unit and remove high voltage wires. Check resistance of heater, replace if open.


LED is
FLASHING
OFF
ON
24 VOLTS BETWEEN R & C ON J2?
YES
No
DEFECTIVE IGC BOARD
1. BLOWN 5 AMP FUSE
2. DEFECTIVE 24V TRANS.
3. BROKEN WIRE
4. NO POWER TO UNIT
1 FLASH - INDOOR FAN DELAY MODIFIED (HEATING)
2 FLASHES - OPENING OF LIMIT SWITCH
3 FLASHES - FLAME SENSOR INDICATES FLAME WITH CLOSED GAS VALVE
4 FLASHES - LIMIT SWITCH CYCLED 4 TIMES ON SINGLE CALL FOR HEAT
5 FLASHES - IGNITION LOCKOUT (No ignition within 15 minutes)
6 FLASHES - INDUCED DRAFT MOTOR FAULT (No signal from the Hall Effect Sensor for 60 seconds)
7 FLASHES - OPENING OF ROLLOUT SWITCH
8 FLASHES - HARDWARE OR SOFTWARE FAULT
9 FLASHES - SOFTWARE LOCKOUT
CALL FOR
COOLING
COMPRESSOR & OUTDOOR FAN MOTOR START IMMEDIATELY
1 SECOND ON DELAY FOR INDOOR FAN
COOLING DEMAND SATISFIED
COMPRESSOR AND OUTDOOR FAN STOP IMMEDIATELY
30 SECOND OFF DELAY FOR INDOOR FAN
HEATING
'W1' FROM BASE CONTROL BOARD ENERGIZES 'W' ON IGC - 1 MINUTE LOCK-ON
COMBUSTION RELAY ON IGC IS ENERGIZED
COMBUSTION RELAY ENERGIZES INDUCED DRAFT MOTOR (IDM) THROUGH TERMINAL 'CM' ON IGC
IF IDM IS TURNING AT CORRECT SPEED (AT LEAST 2400 RPM), HALL EFFECT SENSOR SENDS CORRECT SIGNAL TO TERMINAL 'J1' ON IGC
IF LIMIT SWITCH AND ROLLOUT SWITCH ARE CLOSED, IGC SAFETY LOGIC WILL INITIATE IGNITION SEQUENCE
IGC HIGH VOLTAGE TRANSFORMER CREATES A 10,000 VOLT SPARK FOR 5 SECONDS
IGC SAFETY LOGIC OPENS GAS VALVE FOR 5 SECONDS
DOES IGC DETECT .2 MICROAMPS FOR 2 SECONDS
No
Yes
IGC SAFETY LOGIC WILL SHUT OFF GAS VALVE AND SPARK
20 SECOND PURGE OF HEAT EXCHANGER
IS THIS THE 33RD RETRY? (OR 15 MINUTES)
No
Yes
IGNITION LOCKOUT (5 FLASHES OF LED)
AFTER 45 SECONDS (OR LESS IF THE TIMING HAS BEEN REDUCED DUE TO LIMIT SWITCH TRIPS) IGC WILL ENERGIZE BLOWER RELAY
DID LIMIT SWITCH OPEN BEFORE THE 45 SECONDS (OR THE MODIFIED TIME) HAS TIMED OUT?
Yes
SUBTRACT 5 SECONDS (OR ANOTHER 5 SECONDS) FROM INDOOR FAN ON TIME DELAY
No
NORMAL HEATING OPERATION
HEATING DEMAND SATISFIED
IDM STOPS, SAFETY LOGIC SHUTS OFF GAS VALVE
45 SECOND BLOWER SHUTOFF DELAY (DELAY EXTENDED BY 5 SECONDS FOR EACH LIMIT SWITCH TRIP - MAXIMUM DELAY: 3 MINUTES)

LEGEND

IDM — Induced-Draft Motor
IGC — Integrated Gas Unit Controller

NOTE: Thermostat Fan Switch in the "AUTO" position.

Fig. 38 — IGC Service Analysis Logic

Table 71 — 5K Thermistor Temperature vs. Resistance (SCT Sensors) (English)

TEMP (F)	VOLTAGE DROP (V)	RESISTANCE (Ohms)
–25	3.699	98,010
–24	3.689	94,707
–23	3.679	91,522
–22	3.668	88,449
–21	3.658	85,486
–20	3.647	82,627
–19	3.636	79,871
–18	3.624	77,212
–17	3.613	74,648
–16	3.601	72,175
–15	3.588	69,790
–14	3.576	67,490
–13	3.563	65,272
–12	3.550	63,133
–11	3.536	61,070
–10	3.523	59,081
–9	3.509	57,162
–8	3.494	55,311
–7	3.480	53,526
–6	3.465	51,804
–5	3.450	50,143
–4	3.434	48,541
–3	3.418	46,996
–2	3.402	45,505
–1	3.386	44,066
0	3.369	42,679
1	3.352	41,339
2	3.335	40,047
3	3.317	38,800
4	3.299	37,596
5	3.281	36,435
6	3.262	35,313
7	3.243	34,231
8	3.224	33,185
9	3.205	32,176
10	3.185	31,202
11	3.165	30,260
12	3.145	29,351
13	3.124	28,473
14	3.103	27,624
15	3.082	26,804
16	3.060	26,011
17	3.038	25,245
18	3.016	24,505
19	2.994	23,789
20	2.972	23,096
21	2.949	22,427
22	2.926	21,779
23	2.903	21,153
24	2.879	20,547
25	2.856	19,960
26	2.832	19,393
27	2.808	18,843
28	2.784	18,311
29	2.759	17,796
30	2.735	17,297
31	2.710	16,814
32	2.685	16,346
33	2.660	15,892
34	2.634	15,453
35	2.609	15,027
36	2.583	14,614
37	2.558	14,214
38	2.532	13,826
39	2.506	13,449
40	2.480	13,084
41	2.454	12,730
42	2.428	12,387
43	2.402	12,053
44	2.376	11,730
45	2.349	11,416
46	2.323	11,112
47	2.296	10,816
48	2.270	10,529
49	2.244	10,250
50	2.217	9,979
51	2.191	9,717
52	2.165	9,461
53	2.138	9,213
54	2.112	8,973
55	2.086	8,739
56	2.060	8,511
57	2.034	8,291
58	2.008	8,076
59	1.982	7,686
60	1.956	7,665
61	1.930	7,468
62	1.905	7,277
63	1.879	7,091
64	1.854	6,911
65	1.829	6,735
66	1.804	6,564
67	1.779	6,399
68	1.754	6,238
69	1.729	6,081
70	1.705	5,929
71	1.681	5,781
72	1.656	5,637
73	1.632	5,497
74	1.609	5,361
75	1.585	5,229
76	1.562	5,101
77	1.538	4,976
78	1.516	4,855
79	1.493	4,737
80	1.470	4,622
81	1.448	4,511
82	1.426	4,403
83	1.404	4,298
84	1.382	4,196
85	1.361	4,096
86	1.340	4,000
87	1.319	3,906
88	1.298	3,814
89	1.278	3,726
90	1.257	3,640
91	1.237	3,556
92	1.217	3,474
93	1.198	3,395
94	1.179	3,318
95	1.160	3,243
96	1.141	3,170
97	1.122	3,099
98	1.104	3,031
99	1.086	2,964
100	1.068	2,898
101	1.051	2,835
102	1.033	2,773
103	1.016	2,713
104	0.999	2,655
105	0.983	2,597
106	0.966	2,542
107	0.950	2,488
108	0.934	2,436
109	0.918	2,385
110	0.903	2,335
111	0.888	2,286
112	0.873	2,239
113	0.858	2,192
114	0.843	2,147
115	0.829	2,103
116	0.815	2,060
117	0.801	2,018
118	0.787	1,977
119	0.774	1,937
120	0.761	1,898
121	0.748	1,860
122	0.735	1,822
123	0.723	1,786
124	0.710	1,750
125	0.698	1,715
126	0.686	1,680
127	0.674	1,647
128	0.663	1,614
129	0.651	1,582
130	0.640	1,550
131	0.629	1,519
132	0.618	1,489
133	0.608	1,459
134	0.597	1,430
135	0.587	1,401
136	0.577	1,373
137	0.567	1,345
138	0.557	1,318
139	0.548	1,291
140	0.538	1,265
141	0.529	1,240
142	0.520	1,214
143	0.511	1,190
144	0.502	1,165
145	0.494	1,141
146	0.485	1,118
147	0.477	1,095
148	0.469	1,072
149	0.461	1,050
150	0.453	1,029
151	0.445	1,007
152	0.438	986
153	0.430	965
154	0.423	945
155	0.416	925
156	0.408	906
157	0.402	887
158	0.395	868
159	0.388	850
160	0.381	832
161	0.375	815
162	0.369	798
163	0.362	782
164	0.356	765
165	0.350	750
166	0.344	734
167	0.339	719
168	0.333	705
169	0.327	690
170	0.322	677
171	0.317	663
172	0.311	650
173	0.306	638
174	0.301	626
175	0.296	614
176	0.291	602
177	0.286	591
178	0.282	581
179	0.277	570
180	0.272	561
181	0.268	551
182	0.264	542
183	0.259	533
184	0.255	524
185	0.251	516
186	0.247	508
187	0.243	501
188	0.239	494
189	0.235	487
190	0.231	480
191	0.228	473
192	0.224	467
193	0.220	461
194	0.217	456
195	0.213	450
196	0.210	445
197	0.206	439
198	0.203	434
199	0.200	429
200	0.197	424
201	0.194	419
202	0.191	415
203	0.188	410
204	0.185	405
205	0.182	401
206	0.179	396
207	0.176	391
208	0.173	386
209	0.171	382
210	0.168	377
211	0.165	372
212	0.163	367
213	0.160	361
214	0.158	356
215	0.155	350
216	0.153	344
217	0.151	338
218	0.148	332
219	0.146	325
220	0.144	318
221	0.142	311
222	0.140	304
223	0.138	297
224	0.135	289
225	0.133	282

Table 72 — 5K Thermistor Temperature vs. Resistance (SCT Sensors) (SI)

TEMP (C)	VOLTAGE DROP (V)	RESISTANCE (Ohms)
–32	3.705	100,260
–31	3.687	94,165
–30	3.668	88,480
–29	3.649	83,170
–28	3.629	78,125
–27	3.608	73,580
–26	3.586	69,250
–25	3.563	65,205
–24	3.539	61,420
–23	3.514	57,875
–22	3.489	54,555
–21	3.462	51,450
–20	3.434	48,536
–19	3.406	45,807
–18	3.376	43,247
–17	3.345	40,845
–16	3.313	38,592
–15	3.281	38,476
–14	3.247	34,489
–13	3.212	32,621
–12	3.177	30,866
–11	3.140	29,216
–10	3.103	27,633
–9	3.065	26,202
–8	3.025	24,827
–7	2.985	23,532
–6	2.945	22,313
–5	2.903	21,163
–4	2.860	20,079
–3	2.817	19,058
–2	2.774	18,094
–1	2.730	17,184
0	2.685	16,325
1	2.639	15,515
2	2.593	14,749
3	2.547	14,026
4	2.500	13,342
5	2.454	12,696
6	2.407	12,085
7	2.360	11,506
8	2.312	10,959
9	2.265	10,441
10	2.217	9,949
11	2.170	9,485
12	2.123	9,044
13	2.076	8,627
14	2.029	8,231
15	1.982	7,855
16	1.935	7,499
17	1.889	7,161
18	1.844	6,840
19	1.799	6,536
20	1.754	6,246
21	1.710	5,971
22	1.666	5,710
23	1.623	5,461
24	1.580	5,225
25	1.538	5,000
26	1.497	4,786
27	1.457	4,583
28	1.417	4,389
29	1.378	4,204
30	1.340	4,028
31	1.302	3,861
32	1.265	3,701
33	1.229	3,549
34	1.194	3,404
35	1.160	3,266
36	1.126	3,134
37	1.093	3,008
38	1.061	2,888
39	1.030	2,773
40	0.999	2,663
41	0.969	2,559
42	0.940	2,459
43	0.912	2,363
44	0.885	2,272
45	0.858	2,184
46	0.832	2,101
47	0.807	2,021
48	0.782	1,944
49	0.758	1,871
50	0.735	1,801
51	0.713	1,734
52	0.691	1,670
53	0.669	1,609
54	0.649	1,550
55	0.629	1,493
56	0.610	1,439
57	0.591	1,387
58	0.573	1,337
59	0.555	1,290
60	0.538	1,244
61	0.522	1,200
62	0.506	1,158
63	0.490	1,118
64	0.475	1,079
65	0.461	1,041
66	0.447	1,006
67	0.433	971
68	0.420	938
69	0.407	906
70	0.395	876
71	0.383	836
72	0.371	805
73	0.360	775
74	0.349	747
75	0.339	719
76	0.329	693
77	0.319	669
78	0.309	645
79	0.300	623
80	0.291	602
81	0.283	583
82	0.274	564
83	0.266	547
84	0.258	531
85	0.251	516
86	0.244	502
87	0.237	489
88	0.230	477
89	0.223	466
90	0.217	456
91	0.211	446
92	0.204	436
93	0.199	427
94	0.193	419
95	0.188	410
96	0.182	402
97	0.177	393
98	0.172	385
99	0.168	376
100	0.163	367
101	0.158	357
102	0.154	346
103	0.150	335
104	0.146	324
105	0.142	312
106	0.138	299
107	0.134	285

Table 73 — 10K Thermistor vs. Resistance (T55, T56, OAT, RAT, EDT, LAT Sensors) (English)

TEMP (F)	VOLTAGE DROP (V)	RESISTANCE (Ohms)
–25	4.758	196,453
–24	4.750	189,692
–23	4.741	183,300
–22	4.733	177,000
–21	4.724	171,079
–20	4.715	165,238
–19	4.705	159,717
–18	4.696	154,344
–17	4.686	149,194
–16	4.676	144,250
–15	4.665	139,443
–14	4.655	134,891
–13	4.644	130,402
–12	4.633	126,183
–11	4.621	122,018
–10	4.609	118,076
–9	4.597	114,236
–8	4.585	110,549
–7	4.572	107,006
–6	4.560	103,558
–5	4.546	100,287
–4	4.533	97,060
–3	4.519	94,020
–2	4.505	91,019
–1	4.490	88,171
0	4.476	85,396
1	4.461	82,729
2	4.445	80,162
3	4.429	77,662
4	4.413	75,286
5	4.397	72,940
6	4.380	70,727
7	4.363	68,542
8	4.346	66,465
9	4.328	64,439
10	4.310	62,491
11	4.292	60,612
12	4.273	58,781
13	4.254	57,039
14	4.235	55,319
15	4.215	53,693
16	4.195	52,086
17	4.174	50,557
18	4.153	49,065
19	4.132	47,627
20	4.111	46,240
21	4.089	44,888
22	4.067	43,598
23	4.044	42,324
24	4.021	41,118
25	3.998	39,926
26	3.975	38,790
27	3.951	37,681
28	3.927	36,610
29	3.903	35,577
30	3.878	34,569
31	3.853	33,606
32	3.828	32,654
33	3.802	31,752
34	3.776	30,860
35	3.750	30,009
36	3.723	29,177
37	3.697	28,373
38	3.670	27,597
39	3.654	26,838
40	3.615	26,113
41	3.587	25,396
42	3.559	24,715
43	3.531	24,042
44	3.503	23,399
45	3.474	22,770
46	3.445	22,161
47	3.416	21,573
48	3.387	20,998
49	3.357	20,447
50	3.328	19,903
51	3.298	19,386
52	3.268	18,874
53	3.238	18,384
54	3.208	17,904
55	3.178	17,441
56	3.147	16,991
57	3.117	16,552
58	3.086	16,131
59	3.056	15,714
60	3.025	15,317
61	2.994	14,925
62	2.963	14,549
63	2.932	14,180
64	2.901	13,824
65	2.870	13,478
66	2.839	13,139
67	2.808	12,814
68	2.777	12,493
69	2.746	12,187
70	2.715	11,884
71	2.684	11,593
72	2.653	11,308
73	2.622	11,031
74	2.592	10,764
75	2.561	10,501
76	2.530	10,249
77	2.500	10,000
78	2.470	9,762
79	2.439	9,526
80	2.409	9,300
81	2.379	9,078
82	2.349	8,862
83	2.319	8,653
84	2.290	8,448
85	2.260	8,251
86	2.231	8,056
87	2.202	7,869
88	2.173	7,685
89	2.144	7,507
90	2.115	7,333
91	2.087	7,165
92	2.059	6,999
93	2.030	6,838
94	2.003	6,683
95	1.975	6,530
96	1.948	6,383
97	1.921	6,238
98	1.894	6,098
99	1.867	5,961
100	1.841	5,827
101	1.815	5,698
102	1.789	5,571
103	1.763	5,449
104	1.738	5,327
105	1.713	5,210
106	1.688	5,095
107	1.663	4,984
108	1.639	4,876
109	1.615	4,769
110	1.591	4,666
111	1.567	4,564
112	1.544	4,467
113	1.521	4,370
114	1.498	4,277
115	1.475	4.185
116	1.453	4,096
117	1.431	4,008
118	1.409	3,923
119	1.387	3,840
120	1.366	3,759
121	1.345	3,681
122	1.324	3,603
123	1.304	3,529
124	1.284	3,455
125	1.264	3,383
126	1.244	3,313
127	1.225	3,244
128	1.206	3,178
129	1.187	3,112
130	1.168	3,049
131	1.150	2,986
132	1.132	2,926
133	1.114	2,866
134	1.096	2,809
135	1.079	2,752
136	1.062	2,697
137	1.045	2,643
138	1.028	2,590
139	1.012	2,539
140	0.996	2,488
141	0.980	2,439
142	0.965	2,391
143	0.949	2,343
144	0.934	2,297
145	0.919	2,253
146	0.905	2,209
147	0.890	2,166
148	0.876	2,124
149	0.862	2,083
150	0.848	2,043
151	0.835	2,003
152	0.821	1,966
153	0.808	1,928
154	0.795	1,891
155	0.782	1,855
156	0.770	1,820
157	0.758	1,786
158	0.745	1,752
159	0.733	1,719
160	0.722	1,687
161	0.710	1,656
162	0.699	1,625
163	0.687	1,594
164	0.676	1,565
165	0.666	1,536
166	0.655	1,508
167	0.645	1,480
168	0.634	1,453
169	0.624	1,426
170	0.614	1,400
171	0.604	1,375
172	0.595	1,350
173	0.585	1,326
174	0.576	1,302
175	0.567	1,278
176	0.558	1,255
177	0.549	1,233
178	0.540	1,211
179	0.532	1,190
180	0.523	1,169
181	0.515	1,148
182	0.507	1,128
183	0.499	1,108
184	0.491	1,089
185	0.483	1,070
186	0.476	1,052
187	0.468	1,033
188	0.461	1,016
189	0.454	998
190	0.447	981
191	0.440	964
192	0.433	947
193	0.426	931
194	0.419	915
195	0.413	900
196	0.407	885
197	0.400	870
198	0.394	855
199	0.388	841
200	0.382	827
201	0.376	814
202	0.370	800
203	0.365	787
204	0.359	774
205	0.354	762
206	0.349	749
207	0.343	737
208	0.338	725
209	0.333	714
210	0.328	702
211	0.323	691
212	0.318	680
213	0.314	670
214	0.309	659
215	0.305	649
216	0.300	639
217	0.296	629
218	0.292	620
219	0.288	610
220	0.284	601
221	0.279	592
222	0.275	583
223	0.272	574
224	0.268	566
225	0.264	557

Table 74 — 10K Thermistor vs. Resistance (T55, T56, OAT, RAT, EDT, LAT Sensors) (SI)

TEMP (C)	VOLTAGE DROP (V)	RESISTANCE (Ohms)	TEMP (C)	VOLTAGE DROP (V)	RESISTANCE (Ohms)	TEMP (C)	VOLTAGE DROP (V)	RESISTANCE (Ohms)
–32	4.762	200,510	**15**	3.056	15,714	**62**	0.940	2,315
–31	4.748	188,340	**16**	3.000	15,000	**63**	0.913	2,235
–30	4.733	177,000	**17**	2.944	14,323	**64**	0.887	2,157
–29	4.716	166,342	**18**	2.889	13,681	**65**	0.862	2,083
–28	4.700	156,404	**19**	2.833	13,071	**66**	0.837	2,011
–27	4.682	147,134	**20**	2.777	12,493	**67**	0.813	1,943
–26	4.663	138,482	**21**	2.721	11,942	**68**	0.790	1,876
–25	4.644	130,402	**22**	2.666	11,418	**69**	0.767	1,813
–24	4.624	122,807	**23**	2.610	10,921	**70**	0.745	1,752
–23	4.602	115,710	**24**	2.555	10,449	**71**	0.724	1,693
–22	4.580	109,075	**25**	2.500	10,000	**72**	0.703	1,637
–21	4.557	102,868	**26**	2.445	9,571	**73**	0.683	1,582
–20	4.533	97,060	**27**	2.391	9,164	**74**	0.663	1,530
–19	4.508	91,588	**28**	2.337	8,776	**75**	0.645	1,480
–18	4.482	86,463	**29**	2.284	8,407	**76**	0.626	1,431
–17	4.455	81,662	**30**	2.231	8,056	**77**	0.608	1,385
–16	4.426	77,162	**31**	2.178	7,720	**78**	0.591	1,340
–15	4.397	72,940	**32**	2.127	7,401	**79**	0.574	1,297
–14	4.367	68,957	**33**	2.075	7,096	**80**	0.558	1,255
–13	4.335	65,219	**34**	2.025	6,806	**81**	0.542	1,215
–12	4.303	61,711	**35**	1.975	6,530	**82**	0.527	1,177
–11	4.269	58,415	**36**	1.926	6,266	**83**	0.512	1,140
–10	4.235	55,319	**37**	1.878	6,014	**84**	0.497	1,104
–9	4.199	52,392	**38**	1.830	5,774	**85**	0.483	1,070
–8	4.162	49,640	**39**	1.784	5,546	**86**	0.470	1,037
–7	4.124	47,052	**40**	1.738	5,327	**87**	0.457	1,005
–6	4.085	44,617	**41**	1.692	5,117	**88**	0.444	974
–5	4.044	42,324	**42**	1.648	4,918	**89**	0.431	944
–4	4.003	40,153	**43**	1.605	4,727	**90**	0.419	915
–3	3.961	38,109	**44**	1.562	4,544	**91**	0.408	889
–2	3.917	36,182	**45**	1.521	4,370	**92**	0.396	861
–1	3.873	34,367	**46**	1.480	4,203	**93**	0.386	836
0	3.828	32,654	**47**	1.439	4,042	**94**	0.375	811
1	3.781	31,030	**48**	1.400	3,889	**95**	0.365	787
2	3.734	29,498	**49**	1.362	3,743	**96**	0.355	764
3	3.686	28,052	**50**	1.324	3,603	**97**	0.345	742
4	3.637	26,686	**51**	1.288	3,469	**98**	0.336	721
5	3.587	25,396	**52**	1.252	3,340	**99**	0.327	700
6	3,537	24,171	**53**	1.217	3,217	**100**	0.318	680
7	3.485	23,013	**54**	1.183	3,099	**101**	0.310	661
8	3.433	21,918	**55**	1.150	2,986	**102**	0.302	643
9	3.381	20,883	**56**	1.117	2,878	**103**	0.294	626
10	3.328	19,903	**57**	1.086	2,774	**104**	0.287	609
11	3.274	18,972	**58**	1.055	2,675	**105**	0.279	592
12	3.220	18,090	**59**	1.025	2,579	**106**	0.272	576
13	3.165	17,255	**60**	0.996	2,488	**107**	0.265	561
14	3.111	16,474	**61**	0.968	2,400			

Table 75 — Suction Pressure Transducer Pressure (PSIG) vs. Voltage (SSP-A, SSP-B)

PRESSURE (PSIG)	VOLTAGE DROP (V)	PRESSURE (PSIG)	VOLTAGE DROP (V)	PRESSURE (PSIG)	VOLTAGE DROP (V)	PRESSURE (PSIG)	VOLTAGE DROP (V)
0	0.290	**34**	1.436	**68**	2.582	**102**	3.728
1	0.324	**35**	1.470	**69**	2.615	**103**	3.761
2	0.357	**36**	1.503	**70**	2.649	**104**	3.795
3	0.391	**37**	1.537	**71**	2.683	**105**	3.829
4	0.425	**38**	1.571	**72**	2.717	**106**	3.862
5	0.458	**39**	1.604	**73**	2.750	**107**	3.896
6	0.492	**40**	1.638	**74**	2.784	**108**	3.930
7	0.526	**41**	1.672	**75**	2.818	**109**	3.964
8	0.560	**42**	1.705	**76**	2.851	**110**	3.997
9	0.593	**43**	1.739	**77**	2.885	**111**	4.031
10	0.627	**44**	1.773	**78**	2.919	**112**	4.065
11	0.661	**45**	1.807	**79**	2.952	**113**	4.098
12	0.694	**46**	1.840	**80**	2.986	**114**	4.132
13	0.728	**47**	1.874	**81**	3.020	**115**	4.166
14	0.762	**48**	1.908	**82**	3.054	**116**	4.200
15	0.795	**49**	1.941	**83**	3.087	**117**	4.233
16	0.829	**50**	1.975	**84**	3.121	**118**	4.267
17	0.863	**51**	2.009	**85**	3.155	**119**	4.301
18	0.897	**52**	2.042	**86**	3.188	**120**	4.334
19	0.930	**53**	2.076	**87**	3.222	**121**	4.368
20	0.964	**54**	2.110	**88**	3.256	**122**	4.402
21	0.998	**55**	2.144	**89**	3.290	**123**	4.435
22	1.031	**56**	2.177	**90**	3.323	**124**	4.469
23	1.065	**57**	2.211	**91**	3.357	**125**	4.503
24	1.099	**58**	2.245	**92**	3.391	**126**	4.537
25	1.132	**59**	2.278	**93**	3.424	**127**	4.570
26	1.166	**60**	2.312	**94**	3.458	**128**	4.604
27	1.200	**61**	2.346	**95**	3.492	**129**	4.638
28	1.234	**62**	2.380	**96**	3.525	**130**	4.671
29	1.267	**63**	2.413	**97**	3.559	**131**	4.705
30	1.301	**64**	2.447	**98**	3.593	**132**	4.739
31	1.335	**65**	2.481	**99**	3.627	**133**	4.772
32	1.368	**66**	2.514	**100**	3.660	**134**	4.806
33	1.402	**67**	2.548	**101**	3.694	**135**	4.840

APPENDIX A — CCN TABLES

All A series units with *Comfort*Link™ Controls have a port for interface with the Carrier Comfort Network (CCN). On TB3 there is a J11 jack which can be used for temporary connection to the CCN network or to computers equipped with CCN software like the Service Tool. Also on TB3 there are screw connections that can be used for more permanent CCN connections.

In the following tables the structure of the tables which are used with the Service tool as well as the names and data that are included in each table are shown. As a reference the equivalent Scrolling Marquee tables and names are included. There are several CCN variables that are not displayed through the Scrolling Marquee and are used for more extensive diagnostics and system evaluations.

SERVICE TOOL AND CCN TABLES

GRAPHICS	POINTS	MODIFY	REMOVE	DIAGNOSTICS	CONTROLLER-TIME	QUIT
Not used on this unit	**BLDGPRES**	**TIME-SCHED**	Used to remove controller from list	**SERVICE**	Used to read controller time information	Used to exit the Service Tool
	CAPACITY	→ PERIOD 1		→ ALRTLMTS		
	CIRCUITA	→ PERIOD 2		→ DISLOGIC		
	CIRCUITB	→ PERIOD 3		→ SENSCNFG		
	ECONWORK	→ PERIOD 4		**MAINTENANCE**		
	ENTHALPY	→ PERIOD 5		→ AIRQUALT		
	FLTSWORK	→ PERIOD 6		→ ALARMS		
	HEATSTAT	→ PERIOD 7		→ ANALOGIN		
	SENSWORK	→ PERIOD 8		→ COMPWORK		
	SFS_WORK	**SETPNT-SCHED**		→ DMDLIMIT		
	STATUS1	**GRAPHICS**		→ ECONDIAG		
	STATUS2	**CONTROLLER**		→ ECONMIN		
	TSTAT	→ AIR_QLTY		→ EDT_WORK		
		→ ALARMDEF		→ INPUTS		
		→ BP_CTRL		→ LINKDEFM		
		→ BRODEFS		→ MODES		
		→ CDMD_CFG		→ OCCDEFME		
		→ CONFIG		→ OUTPUTS		
		→ COOL_CFG		→ STRTHOUR		
		→ CTLR-ID		→ TESTOUTS		
		→ DISPLAY		→ VERSIONS		
		→ DMD_LIM		**VERIFY-CONFIG**		
		→ HEAT_CFG		**ALARM-HISTORY**		
		→ HOLIDAY				
		→ OCCDEFCS				
		→ SCHEDOVR				
		→ SET_PNT				
		→ SFANVFD				
		→ UNIT				
		NAMES				
		UPLOAD				
		DOWNLOAD				

APPENDIX A — CCN POINTS

BLDGPRES — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	BP	Building Pressure	NO	X.XXX	in H2O	-0.25 TO 0.25	PRESSURES	BLDG
Status Display	SFS	Supply Fan Status Input	YES	ON/OFF	—	On/Off	INPUT	FAN.S
Status Display	SFAN	Supply Fan State	YES	ON/OFF	—	On/Off	OUTPUTS	S.FAN
Status Display	ECONOCMD	Econo Damper Command Pos	YES	XXX	%	0 to 100%	OUTPUTS	E.PWR
Status Display	ECONOPOS	Econo Damper Current Pos	NO	XXX	%	0 to 100%	OUTPUTS	EC.AP
Status Display	ECONOMIN	Economizer Min.Position	YES	XXX	%	0 to 100%	CONFIGURATION	MIN.P
Status Display	IAQMINP	IAQ Demand Vent Min.Pos.	YES	XXX	%	0 to 100%	CONFIGURATION	AQ.MP
Status Display	PE_A	Power Exhaust Stage A	NO	ON/OFF	—	On/Off	OUTPUTS	PE.A
Status Display	PE_B	Power Exhaust Stage B	NO	ON/OFF	—	On/Off	OUTPUTS	PE.B
Status Display	PE_C	Power Exhaust Stage C	NO	ON/OFF	—	On/Off	OUTPUTS	PE.C
Status Display	BPSMZ	BP Load Factor	NO	XXX	—	0-100%	PRESSURES	BPSZ
Status Display	BPRISE	BP Rise Per Stage	NO	X.XXX	—	-50 TO 50	—	—
Status Display	BPINT	BP PID/Integral term	NO	X.XXX	—	-10 to +10	PRESSURES	BP.IT
Status Display	BPZ	BP PID Threshold	NO	X.XXX	—	10 to +10	—	—
Status Display	BPY	BP Deadband	NO	X.XXX	—	10 to +10	—	—
Status Display	BPERROR	Building Pressure Error	NO	X.XXX	—	-0.75 to +0.75	PRESSURES	BLDG
Status Display	BPRATE	Rate of Chng of BPERROR	NO	X.XXX	—	-10 to +10	—	—
Status Display	BPHPOVRD	High BP Override	YES	XXX	—	On/Off	CONFIGURATION	BP.HP
Status Display	BPLPOVRD	Low BP Override	YES	XXX	—	On/Off	CONFIGURATION	BP.LP

CAPACITY — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	SMZ	Capacity Load Factor	NO	XXX	%	-100 TO +100	RUN STATUS	LOD.F
Status Display	RISE_PCT	Rise Per Percent Cpcty	NO	XX.XX	—	0-100%	—	—
Status Display	ADDRISE	Next Stage EDT Decrease	NO	XX.XX	F	0 TO 30	—	—
Status Display	SUBRISE	Next Stage EDT Increase	NO	XX.XX	F	30 TO 0	—	—
Status Display	Z_PLUS	Cap Threshold Adding	NO	XXX.X	—	0 TO 125	—	—
Status Display	Y_PLUS	Cap Deadband Adding	NO	XXX.X	F	0 TO 10	—	—
Status Display	Y_MINUS	Cap Deadband Subtracting	NO	XXX.X	F	10 TO 0	—	—
Status Display	Z_MINUS	Cap Threshold Subtracting	NO	XXX.X	—	-0 TO -125	—	—
Status Display	COOLCPNT	Cooling Control Point	YES	XXX.X	F	45 TO 90	—	—
Status Display	MAT	Mixed Air Temperature	YES	XXX.X	F	-40 TO 245	TEMPERATURES	MAT
Status Display	EDT	Evaporator Discharge Tmp	NO	XXX.X	F	-40 TO 245	TEMPERATURES	EDT
Status Display	RAT	Return Air Temperature	YES	XXX.X	F	-40 TO 245	TEMPERATURES	RAT
Status Display	OAT	Outside Air Temperature	YES	XXX.X	F	-40 TO 245	TEMPERATURES	OAT
Status Display	ECONOPOS	Econo Damper Current Pos	NO	XXX	%	0-100%	OUTPUTS	EC.AP
Status Display	SLO_CHNG	Slow Change Cap Override	YES	ON/OFF	—	On/Off	—	—
Status Display	LOW_TEMP	Low Temp Cap Override	YES	ON/OFF	—	On/Off	—	—
Status Display	HI_TEMP	High Temp Cap Override	YES	ON/OFF	—	On/Off	—	—
Status Display	PULLDOWN	Pull Down Cap Override	YES	ON/OFF	—	On/Off	—	—

APPENDIX A — CCN POINTS (cont)

CIRCUITA — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	CMPA1	Compressor A1	NO	ON/OFF	—	On/Off	OUTPUTS	A1
Status Display	CSB_A1	Compressor A1 Feedback	NO	ON/OFF	—	On/Off	INPUTS	CS.A1
Status Display	CMPA1_TG	Compressor A1 Timeguard	NO	XXXX	SEC	0-1000	INPUTS	TG.A1
Status Display	CMPA2	Compressor A2	NO	ON/OFF	—	On/Off	OUTPUTS	A2
Status Display	CSB_A2	Compressor A2 Feedback	NO	ON/OFF	—	On/Off	INPUTS	CS.A2
Status Display	CMPA2_TG	Compressor A2 Timeguard	NO	XXXX	SEC	0-1000	INPUTS	TG.A1
Status Display	MLV	Minimum Load Valve	NO	ON/OFF	—	On/Off	CONFIGURATION	S.MLV
Status Display	SP_A	Cir A Suction Pressure	NO	XXX.X	PSIG	0 TO 450	PRESSURES	SSP.A
Status Display	SSTA	Cir A Sat Suction Temp	YES	XXX.X	F	-40 TO 160	TEMPERATURES	SST.A
Status Display	DP_A	Cir A Discharge Pressure	NO	XXX.X	PSIG	0 TO 450	PRESSURES	SCP.A
Status Display	SCTA	Cir A Sat Condensing Tmp	YES	XXX.X	F	-40 TO 160	TEMPERATURES	SCT.A

CIRCUITB — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	CMPB1	Compressor B1	NO	ON/OFF	—	On/Off	OUTPUTS	B1
Status Display	CSB_B1	Compressor B1 Feedback	NO	ON/OFF	—	On/Off	INPUTS	CS.B1
Status Display	CMPB1_TG	Compressor A1 Timeguard	NO	XXXX	SEC	0-1000	INPUTS	TG.B1
Status Display	CMPB2	Compressor B2	NO	ON/OFF	—	On/Off	OUTPUTS	B2
Status Display	CSB_B2	Compressor B2 Feedback	NO	ON/OFF	—	On/Off	INPUTS	CS.B2
Status Display	CMPB2_TG	Compressor B2 Timeguard	NO	XXXX	SEC	0-1000	INPUTS	TG.B2
Status Display	SP_B	Cir B Suction Pressure	NO	XXX.X	PSIG	0 TO 450	PRESSURES	SSP.B
Status Display	SSTB	Cir B Sat Suction Temp	YES	XXX.X	F	-40 TO 160	TEMPERATURES	SST.B
Status Display	DP_B	Cir B Discharge Pressure	NO	XXX.X	PSIG	0 TO 450	PRESSURES	SCP.B
Status Display	SCTB	Cir B Sat Condensing Tmp	YES	XXX.X	F	-40 TO 160	TEMPERATURES	SCT.B

ECONWORK — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	ECONENBL	Remote Economizer Enable	YES	ON/OFF	—	On/Off	INPUTS	E.ENA
Status Display	ECOORIDE	Econo Position Override	YES	ON/OFF	—	On/Off	INPUTS	E.OVR
Status Display	ECACTIVE	Economizer Active ?	NO	YES/NO	—	Yes/No	—	—
Status Display	MIN_POS	Econo Current Min. Pos.	NO	XXX	%	0-100%	INPUTS	E.MPO
Status Display	OAE	Outdoor Air Enthalpy	NO	XX.XX	BTU/LB	18-28 BTU/LB	INPUTS	OA.E
Status Display	RAE	Return Air Enthalpy	NO	XX.XX	BTU/LB	18-28 BTU/LB	INPUTS	RA.E
Status Display	OAEC_SEL	A,B,C,D Curve Select	YES	1,2,3,4,5	—	A=1, B=2, C=3, D=4, CUSTOM=5	CONFIGURATION	OA.EC
Status Display	OAEN_CFG	Outdr.Enth Compare Value	YES	XX.XX	BTU/LB	0-50 BTU/LB	CONFIGURATION	OA.EN
Status Display	ECONCPNT	Economizer Control Point	YES	XXX.X	F	control temperature for economizer	—	—
Status Display	EDT	Evaporator Discharge Tmp	NO	XXX.X	F		TEMPERATURES	EDT
Status Display	SFAN	Supply Fan State	YES	ON/OFF	—	On/Off	OUTPUTS	S.FAN
Status Display	ECONOCMD	Econo Damper Command Pos	YES	XXX	%	0-100%	OUTPUTS	E.PWR
Status Display	ECONOPOS	Econo Damper Current Pos	NO	XXX	%	0-100%	OUTPUTS	EC.AP
Status Display	OAT	Outside Air Temperature	YES	XXX.X	F	-40 TO 240.1	TEMPERATURES	OAT
Status Display	RETURN_T	Controlling Return Temp	YES	XXX.X	F	40.1 TO 240.1	—	—
Status Display	SPACE_T	Controlling Space Temp	YES	XXX.X	F	40 t0 90	—	—
Status Display	SENSUSED	SPT/RAT sensors used	NO	YES/NO	—	Yes/No	—	—
Status Display	ECONHELD	Econ recovery hold off?	NO	YES/NO	—	Yes/No	—	—
Status Display	RAT_LOW	Return Temp too low ?	NO	YES/NO	—	Yes/No	—	—
Status Display	OAT_LOCK	High OAT Lockout Temp	YES	XXX.X	—	55 TO 120 F	CONFIGURATION	OAT.L
Status Display	RATSENS	Return Air Temp Sensor	YES	ENABLE/DISABLE	—	Enable/Disable	—	—
Status Display	ECONBAND	Economizer Temp Deadband	YES	XXX.X	F	0.5 TO 5.0	CONFIGURATION	EC.CB
Status Display	ECONRATE	Economizer Run Time Rate	YES	XXX.X	—	0 TO 120 SEC	—	—
Status Display	ECON_SEL	Econ ChangeOver Select	YES	1,2,3,4,5	—	1=Drybulb,2=Diff Drybulb, 3=Enthaply Curve, 4= Diff Enthalpy	CONFIGURATION	E.CGO
Status Display	ECONOMIN	Economizer Min.Position	YES	XXX	%	0-100%	CONFIGURATION	MIN.P
Status Display	IAQMINP	IAQ Demand Vent Min.Pos.	YES	XXX	%	0-100%	CONFIGURATION	AQ.MP

APPENDIX A — CCN POINTS (cont)

ENTHALPY — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	ALTITUDE	Altitude.....in feet:	YES	XXXX	FT	0-9999	—	—
Status Display	ATMOPRES	Atmospheric Pressure	NO	XX.XXX	in Hg	20-35 INHg	—	—
Status Display	OAE	Outdoor Air Enthalpy	NO	XX.XX	BTU/LB	18-28 BTU/LB	INPUTS	OA.E
Status Display	OAT	Outside Air Temperature	YES	XXX.X	F	-40 TO 240 F	TEMPERATURES	OAT
Status Display	OARH	Outside Air Rel.Humidity	YES	XXX.X	%	0-100%	INPUTS	OA.RH
Status Display	OARHSENS	Outside Air RH Sensor	YES	XXX	—	Enable/Disable	CONFIGURATION	O.RH.S
Status Display	OADEWCFG	OA Dewpoint Temp Limit	YES	XXX.X	F	50 to 62	CONFIGURATION	OA.DL
Status Display	OADEWTMP	OutsideAir DewPoint Temp	NO	XXX.X	F	0 to 100%	—	—
Status Display	OA_HUMR	OutsideAir Humidty Ratio	NO	X.XXXXX	—	0 to 100%	—	—
Status Display	OA_PWS	OA H2O Vapor Sat.Pressur	NO	X.XXX	in Hg		—	—
Status Display	OA_PW	OA H2O Partial.Press.Vap	NO	X.XXXXX	in Hg		—	—
Status Display	RAE	Return Air Enthalpy	NO	X.XX	BTU/LB		INPUTS	RA.E
Status Display	RAT	Return Air Temperature	YES	XXX.X	F	-40 TO 240 F	TEMPERATURES	RAT
Status Display	RETURN_T	Controlling Return Temp	YES	XXX.X	F	-40 TO 240 F	—	—
Status Display	RARH	Return Air Rel.Humidity	YES	XXX.X	%	0 to 100%	INPUTS	RA.RH
Status Display	RATSENS	Return Air Temp Sensor	YES	Enable/Disable	—	Enable/Disable	—	—
Status Display	RARHSENS	Return Air RH Sensor	YES	Enable/Disable	—	Enable/Disable	—	—

FLTSWORK — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	SFAN	Supply Fan State	YES	ON/OFF	—	ON/OFF	OUTPUTS	S.FAN
Status Display	FLTS	Filter Status Input	YES	Clean/Dirty	—	Clean/Dirty	INPUTS	FIL.S
Status Display	FLTSLOGC	Filter Status Normally:	YES	Open/Closed	—	Open/Closed	CONFIGURATION	FTS.L
Status Display	FLTS_ENA	Filter Stat.Sw.Enabled ?	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	FLS.E

HEATSTAT — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	HS1	Heat Stage 1	NO	On/Off	—	On/Off	OUTPUTS	HS.1
Status Display	HS1_TG	Heat Stage 1 Timeguard	NO	XXXX	SEC	0-1000	RUN STATUS	TG.H1
Status Display	HS2	Heat Stage 2	NO	On/Off	—	On/Off	OUTPUTS	HS.2
Status Display	HS2_TG	Heat Stage 2 Timeguard	NO	XXXX	SEC	0-1000	RUN STATUS	TG.H2
Status Display	HS3	Heat Stage 3	NO	On/Off	—	On/Off	OUTPUTS	HS.3
Status Display	HS3_TG	Heat Stage 3 Timeguard	NO	XXXX	SEC	0-1000	RUN STATUS	TG.H3
Status Display	HS4	Heat Stage 4	NO	On/Off	—	On/Off	OUTPUTS	HS.4
Status Display	HS4_TG	Heat Stage 4 Timeguard	NO	XXXX	SEC	0-1000	RUN STATUS	TG.H4
Status Display	HS5	Heat Stage 5	NO	On/Off	—	On/Off	OUTPUTS	HS.5
Status Display	HS5_TG	Heat Stage 5 Timeguard	NO	XXXX	SEC	0-1000	RUN STATUS	TG.H5
Status Display	HS6	Heat Stage 6	NO	On/Off	—	On/Off	OUTPUTS	HS.6
Status Display	HS6_TG	Heat Stage 6 Timeguard	NO	XXXX	SEC	0-1000	RUN STATUS	TG.H6
Status Display	HIR	Heat Interlock Relay	NO	On/Off	—	On/Off	OUTPUTS	—
Status Display	HTSTGTYP	Heat Stage Type	YES	1,2,3,4	—	0=2 stage; 1=4 stage; 2=5 stage; 3=9 stage; 4=11 stage	CONFIGURATION	N.HST
Status Display	HTCAPMAX	Max Cap Change per Cycle	YES	XX.X	%	0-100%	CONFIGURATION	S.CP.M
Status Display	HTOCCENA	Occupied Heating Enabled	YES	Yes/No	—	Yes/No	CONFIGURATION	OCC.H
Status Display	HTSGPIDR	PID algorithm rate	YES	XX	—	90-300	CONFIGURATION	S.PI.R
Status Display	HTSGRISE	Heat Rise dF/sec Clamp	YES	X.XX	—	0.06 to 0.20	CONFIGURATION	S.RIS
Status Display	HT_DGAIN	Derivative Gain	YES	X.X	—	0.0 to 1.5	CONFIGURATION	S.DGN
Status Display	HT_PGAIN	Proportional Gain	YES	X.X	—	1.0 to 1.5	CONFIGURATION	S.P.GN
Status Display	HT_MR_DB	S.Gas DB min.dF/PID Rate	YES	X.X	—	0.5 to 5.0	—	—
Status Display	HT_SG_DB	St.Gas Temp. Dead Band	YES	X.X	F	2.0 to 5.0	CONFIGURATION	S.DB

APPENDIX A — CCN POINTS (cont)

SENSWORK — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	IAQREFL	IAQ Low Reference	YES	XXXX	PPM	0 to 5000	CONFIGURATION	I.4M
Status Display	IAQREFH	IAQ High Reference	YES	XXXX	PPM	0 to 5000	CONFIGURATION	I.20M
Status Display	IAQ_MA	IAQ milliamps	YES	X.XX	—	0 to 20.0	—	—
Status Display	OAQ_MA	OAQ milliamps	YES	X.XX	—	0 to 20.0	—	—
Status Display	IAQ	IAQ - PPM Indoor CO2	YES	XXX	—	0 to 5000	INPUTS	IAQ
Status Display	IAQMINOV	Econ Min. Pos. Override	YES	X	%	0 to 100%	—	—
Status Display	BP	Building Pressure	NO	X.XXX	in H2O		PRESSURES	BP
Status Display	BP_RANGE	Bldg Press (+/-) Range	YES	X.XX	in H2O	0 to 1.0	CONFIGURATION	BP.R
Status Display	SP	Duct Static Pressure	NO	X.XX	in H2O		PRESSURES	DUCT
Status Display	SP_LOW	Duct Press Sensor Lo End	YES	X.XX	—	-10 to 10	CONFIGURATION	SP.H.L
Status Display	SP_HIGH	Duct Press Sensor Hi End	YES	X.XX	—	-10 to 10	CONFIGURATION	SP.L.L

SFS_WORK — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	SFS	Supply Fan Status Input	YES	On/Off	—	On/Off	INPUTS	FAN.S
Status Display	SFAN	Supply Fan State	YES	On/Off	—	On/Off	OUTPUTS	S.FAN
Status Display	SP	Duct Static Pressure	NO	X.XX	in H2O		PRESSURES	DUCT
Status Display	SFS_MON	Fan Stat Monitoring Type	YES	0, 1, 2	F	0 to 2	CONFIGURATION	IF.M
Status Display	SFS_SHUT	Fan fail shuts down unit	YES	yes/no	%	Yes/No	CONFIGURATION	IS.FS
Status Display	SFSLOGIC	Fan Status Sw. Normally:	YES	open/close	in H2O	Open/Closed	CONFIGURATION	SFS.L

STATUS1 — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	SPT	Space Temperature	YES	XXX.X	F	-40 to 240	TEMPERATURES	SPT
Status Display	EDT	Evaporator Discharge Tmp	NO	XXX.X	F		TEMPERATURES	EDT
Status Display	LAT	Leaving Air Temperature	NO	XXX.X	F		TEMPERATURES	LAT
Status Display	RAT	Return Air Temperature	YES	XXX.X	F	-40 to 240	TEMPERATURES	RAT
Status Display	MAT	Mixed Air Temperature	YES	XXX.X	F	-40 to 240	TEMPERATURES	MAT
Status Display	CLSP*	Control Setpoint	NO	XXX.X	F	40 to 90	—	—
Status Display	CCAP	Cooling % Total Capacity	NO	XXX.X	%	0-100%	RUN STATUS	CCAP
Status Display	HCAP	Heating % Total Capacity	NO	XXX.X	%	0-100%	RUN STATUS	HCAP
Status Display	ECACTIVE	Economizer Active ?	NO	yes/no	—	yes/no	—	—
Status Display	SFS	Supply Fan Status Input	YES	On/Off	—	on/off	INPUTS	FAN.S
Status Display	SFAN	Supply Fan State	YES	On/Off	—	on/off	OUTPUTS	S.FAN
Status Display	SP	Duct Static Pressure	NO	X.XX	in H2O	0 to 5	PRESSURES	DUCT
Status Display	OAT	Outside Air Temperature	YES	XXX.X	F	-40 to 240	TEMPERATURES	OAT
Status Display	MIN_POS	Econo Current Min. Pos.	NO	XXX	%	0 to 100	INPUTS	E.MPO
Status Display	BP	Building Pressure	NO	X.XXX	in H2O	-.26 to .26	PRESSURES	BLDG
Status Display	PED	Power Exhaust Damper Pos	YES	XXX	%	0-100%	CONFIGURATION	PE1.P
Status Display	FLTS	Filter Status Input	YES	XXXX	—	Dirty/Clean	INPUTS	FIL.S

*Not used.

APPENDIX A — CCN POINTS (cont)

STATUS2 — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	SPTO	Space Temperature Offset	YES	XX.X	F	-10 TO +10	TEMPERATURES	SPT0
Status Display	SASPRSET	Supply Air Setpnt Reset	NO	XX.X	F	0 to 15	—	—
Status Display	SPRESET	Static Pressure Reset	YES	XX.X	—	0 to 5	—	—
Status Display	ECONENBL	Remote Economizer Enable	YES	On/Off	—	On/Off	INPUTS	E.ENA
Status Display	ECOORIDE	Econo Position Override	YES	On/Off	—	On/Off	INPUTS	E.OVR
Status Display	RMTIN	Remote Input	YES	On/Off	—	On/Off	INPUTS	RE.MT
Status Display	EMSTOP	Emergency Stop	YES	Enable/Disable	—	Enable/Disable	—	—
Status Display	RARH	Return Air Rel.Humidity	YES	XXX	%	0-100%	INPUTS	RA.RH
Status Display	OARH	Outside Air Rel.Humidity	YES	XXX	%	0-100%	INPUTS	OA.RH
Status Display	IAQ	IAQ - PPM Return CO2	YES	XXXX	PPM	0 TO 5000	INPUTS	IAQ
Status Display	IAQIN	IAQ - Discrete Input	YES	Low/High	%	LOW/HIGH	INPUTS	I.AQS
Status Display	EVAC	Evacuation Input	YES	On/Off	—	On/Off	INPUTS	F.EVC
Status Display	PRES	Pressurization Input	YES	On/Off	—	On/Off	INPUTS	F.PRS
Status Display	PURG	Smoke Purge Input	YES	On/Off	—	On/Off	INPUTS	F.PRG
Status Display	FSD	Fire Shutdown Input	YES	On/Off	—	On/Off	INPUTS	FDWN
Status Display	DMD_SW1	Demand Limit Switch 1	YES	On/Off	—	On/Off	INPUTS	DLM.1
Status Display	DMD_SW2	Demand Limit Switch 2	YES	On/Off	—	On/Off	INPUTS	DLM.2

TSTAT — POINTS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Status Display	Y1	Thermostat Y1 Input	YES	On/Off	—	On/Off	INPUTS	Y1
Status Display	Y2	Thermostat Y2 Input	YES	On/Off	—	On/Off	INPUTS	Y2
Status Display	W1	Thermostat W1 Input	YES	On/Off	—	On/Off	INPUTS	W1
Status Display	W2	Thermostat W2 Input	YES	On/Off	—	On/Off	INPUTS	W2
Status Display	G	Thermostat G Input	YES	On/Off	—	On/Off	INPUTS	G

AIR_QLTY — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	IAQINCFG	IAQ Discrete Input Confg	YES	0,1,2	—	0=NO IAQ, 1=DCV, 2=OVERRIDE IAQ	CONFIGURATION	IA.I.C
Configuration	IAQOVPOS	IAQ Econo Override Pos.	YES	XXX	%	0 TO 100%	CONFIGURATION	OVR.P
Configuration	IAQANCFG	IAQ Minpos Sensor Config	YES	0,1,2,3,4	—	0=MIN POS POT, 1=CNTL MIN POS, 2=OVERRIDE IAQ, 3=DCV, 4=NO IAQ	CONFIGURATION	IA.CF
Configuration	IAQINFAN	IAQ Disc.In. Fan Config	YES	0,1,2	—	0=NEVER, 1=OCCUPIED, 2=ALWAYS	CONFIGURATION	IA.IF
Configuration	IAQANFAN	IAQ 4-20 ma Fan Config	YES	0,1,2	—	0=NEVER, 1=OCCUPIED, 2=OVERRIDE IAQ	CONFIGURATION	IA.FN
Configuration	OAQANCFG	OAQ 4-20 ma Sensor Config	YES	0,1,2	—	0=NO OAQ, 1=DCV OAQ, 2=LOKOUT	CONFIGURATION	OA.CF
Configuration	OAQ_USER	User Determined OAQ	YES	XXX	—	400-2000	CONFIGURATION	OAQ-U

APPENDIX A — CCN POINTS (cont)

ALARMDEF — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	ALRM_CNT	Alarm Routing Control	YES	XXXXXXXX	—		—	—
Configuration	EQP_TYPE	Equipment Priority	YES	XXXX	—		—	—
Configuration	RETRY_TM	Comm Failure Retry Time	YES	XXXX	min	1 TO 255	—	—
Configuration	RE-ALARM	Re-Alarm Time	YES	XXXX	min	1 TO 255	—	—
Configuration	ALRM_NAM	Alarm System Name	YES	A-SERIES	—	A-Series	—	—

BP_CNTL — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	PWRX	Power Exhaust Type	YES	0,1,2	—	2=MODULATING, 1=2 STAGE, 0=NONE	CONFIGURATION	PWRX
Configuration	PWRM	Power Exhaust Motors	YES	0,1,2	—	0=none,1=4 motors, 2= 6 motors	CONFIGURATION	PWRM
Configuration	BPSELECT	Modulating PE Alg. Slct	YES	1,2,3	—	Use 2	CONFIGURATION	BP.SL
Configuration	BPZ_GAIN	BP Threshold Adjustment	YES	XXX.X	—	0.1 TO 10	CONFIGURATION	BP.ZG
Configuration	BPPERIOD	BP PID Evaluation Time	YES	XXX	MIN	1 TO 10	CONFIGURATION	BP.DT
Configuration	BPHPLVL	High BP Level	YES	X.XXX	—	0 TO 1.0	CONFIGURATION	BP.HP
Configuration	BPLPLVL	Low BP Level	YES	X.XXX	—	0 TO 1.0	CONFIGURATION	BP.LP

BRODEFS — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	CCNBC	CCN Time.Date Broadcast	YES	On/Off	—	On/Off	RUN STATUS	TIME
Configuration	OATBC	CCN OAT Broadcast	YES	On/Off	—	On/Off	CONFIGURATION	B.OAT
Configuration	OARHBC	CCN OARH Broadcast	YES	On/Off	—	On/Off	CONFIGURATION	B.ORH
Configuration	OAQBC	CCN OAQ Broadcast	YES	On/Off	—	On/Off	CONFIGURATION	B.OAQ
Configuration	GSBC	Global Schedule Broadcst	YES	On/Off	—	On/Off	CONFIGURATION	B.GS
Configuration	CCNCACK	CCN Broadcast Ack'er	YES	On/Off	—	On/Off	CONFIGURATION	B.ACK
Configuration	STARTM	Daylight Savings Start: Month	YES	1-12	—	1-12	TIMECLOCK	STR.M
Configuration	STARTW	Daylight Savings Start: Week	YES	1-52	—	1-52	TIMECLOCK	STR.W
Configuration	STARTD	Daylight Savings Start: Day	YES	1-31	—	1-31	TIMECLOCK	STR.D
Configuration	MINADD	Daylight Savings Start: minutes to Add	YES	XX	—	0 TO 90	TIMECLOCK	M.ADD
Configuration	STOPM	Daylight savings stop: Month	YES	1-12	—	1-12	TIMECLOCK	STP.M
Configuration	STOPW	Daylight savings Stop: Week	YES	1-52	—	1-52	TIMECLOCK	STP.W
Configuration	STOPPD	Daylight savings Stop: Day	YES	1-31	—	1-31	TIMECLOCK	STP.D
Configuration	MINSUB	Daylight savings Stop: minutes to Subtract	YES	XX	—	0 TO 90	TIMECLOCK	M.SUB

CDMD_CFG — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	DMDHHON	Dmd Level (+) Hi Heat ON	YES	X.X	F	0.5 TO 2.0	CONFIGURATION	HH.ON
Configuration	DMDLHON	Dmd Level Lo Heat ON	YES	X.X	F	0.5 TO 2.0	CONFIGURATION	LH.ON
Configuration	DMDLHOFF	Dmd Level (-) Lo Heat OFF	YES	X.X	F	0.5 TO 2.0	CONFIGURATION	LH.OF
Configuration	DMDLCOFF	Dmd Level (-) Lo Cool OFF	YES	X.X	F	0.5 TO 2.0	CONFIGURATION	LC.OF
Configuration	DMDLCON	Dmd Level Lo Cool ON	YES	X.X	F	0.5 TO 2.0	CONFIGURATION	LC.ON
Configuration	DMDHCON	Dmd Level (+) Hi Cool ON	YES	X.X	F	0.5 TO 2.0	CONFIGURATION	HC.ON

APPENDIX A — CCN POINTS (cont)

CONFIG — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	PURGEN	IAQ Purge	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	PRG.E
Configuration	IQPD	IAQ Purge Duration	YES	X.X	MIN	5 TO 60	CONFIGURATION	PRG.D
Configuration	UEFC_CFG	Unocc. Free Cool Config	YES	0,1,2	—	0 = disabled, 1= all the time, 2= x time before occupied	CONFIGURATION	UFC.C
Configuration	UEFCTIME	Unocc. Free Cool Time	YES	XXX	MIN	0 TO 720	CONFIGURATION	UFC.T
Configuration	HTOCCENA	Occupied Heating Enabled	YES	Yes/No	—	Yes/No	CONFIGURATION	OCC.H
Configuration	RSEN	Space Temperature Reset	YES	Enable/Disable	—	Enable/Disable	—	—
Configuration	STATICFG	Static P Control	YES	0,1	—	0=None, 1=VFD Control	CONFIGURATION	SP.C
Configuration	FANM	Fan Mode (0=Auto, 1=cont)	YES	0,1	—	0=Auto, 1 = Continuous	CONFIGURATION	FAN.M
Configuration	KCOOL	TCST Cool Time/Temp Fact	YES	XX	MIN	0 TO 60	CONFIGURATION	C.TC.F
Configuration	KHEAT	TSCT Heat Time/Temp Fact	YES	XX	MIN	0 TO 60	CONFIGURATION	H.TC.F
Configuration	SAMPMINS	VAV Unoc.Fan Retry Time	YES	XX	MIN	0 TO 60	CONFIGURATION	SAMP
Configuration	rmt.c	Remote Switch Config	YES	0,1,2	—	0=None, 1=Occupancy, 2=Start/Stop	CONFIGURATION	RMT.C

COOL_CFG — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	CMPA1ENA	Enable Compressor A1	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	A1.EN
Configuration	CMPA2ENA	Enable Compressor A2	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	A2.EN
Configuration	CMPB1ENA	Enable Compressor B1	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	B1.EN
Configuration	CMOB2ENA	Enable Compressor B2	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	B2.EN
Configuration	MLV_SEL	Minimum Load Valve?	YES	YES/NO	—	YES/NO	CONFIGURATION	S.MLV
Configuration	CSB_A1EN	CSB A1 Feedback Alarm	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	A1.C.E
Configuration	CSB_A2EN	CSB A2 Feedback Alarm	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	A2.C.E
Configuration	CSB_B1EN	CSB B1 Feedback Alarm	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	B1.C.E
Configuration	CSB_B2EN	CSB B2 Feedback Alarm	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	B2.C.E
Configuration	OATLCOMP	Compressor Lockout Temp	YES	XXX.X	F	-20 TO 40	CONFIGURATION	C.L.OA
Configuration	COOL_FOD	Fan-off Delay, Mech Cool	YES	XXX	SEC	0 TO 600	CONFIGURATION	C.L.OA
Configuration	CTRENDLV	Cool Trend Demand Level	YES	XXXX	F	0.1 TO 5.0	CONFIGURATION	CT.LV

CTRL_ID — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration		Device Name	YES	XXXXXXXX	—	text field	—	—
Configuration		Description	YES	XXXXXXXXXXXX	—	text field	—	—
Configuration		Location	YES	XXXXXXXXXXXX	—	text field	—	—
Configuration		Software Part Number	NO	—	—	NOT USED	—	—
Configuration		Model Number	NO	—	—	NOT USED	—	—
Configuration		Serial Number	NO	—	—	NOT USED	—	—
Configuration		Reference Number	NO	—	—	NOT USED	—	—

DISPLAY — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	PASSWORD	Service Password	YES	XXXX	—	1111 is default	CONFIGURATION	PSWD
Configuration	PASS_EBL	Password Enable	YES	Enable/Disable	—	Enable/Disable	CONFIGURATION	PROT
Configuration	DISPUNIT	Metric Display	YES	On/Off	—	On/Off	CONFIGURATION	METR
Configuration	LANGUAGE	Language Selection	YES	0,1,2,3,4	—	0=English, 1= Spanish, 2= French, 3= Portugese	CONFIGURATION	LANG

APPENDIX A — CCN POINTS (cont)

DMD_LIM — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	DMD_CTRL	Demand Limit Select	YES	0,1,2,3	—	0=NO DEMAND LIMIT, 1=SWITCH, 4-20MA, 2=CCN LOADSHED	CONFIGURATION	DMLS
Configuration	DMT20MA	Demand Limit at 20 ma	YES	XXX	%	0-100%	INPUTS	DM.AI
Configuration	SHED_NUM	Loadshd Group Number	YES	XXX	—	0 to 99	CONFIGURATION	LS.GN
Configuration	SHED_DEL	Loadshed Demand Delta	YES	XXX	%	0 to 60%	CONFIGURATION	LS.DD
Configuration	SHED_TIM	Maximum Loadshed Time	YES	XXX	min	0 to 120	CONFIGURATION	LS.TM
Configuration	DLSWSP1	Maximum Limit Sw.1 Setpt	YES	XXX	%	0-100%	CONFIGURATION	DLS.1
Configuration	DLSWSP2	Maximum Limit Sw.2 Setpt	YES	XXX	%	0-100%	CONFIGURATION	DLS.2

HEAT_CFG — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	HEATTYPE	Heat Type (0,1,2,3)	YES	0,1,2,3	—	3=Staged Gas, 2=2-Stage Gas, 1=Electric, 0=No Heat	CONFIGURATION	HT.TY
Configuration	HTOCCENA	Occupied Heat Enabled	YES	Yes/No	—	Only applies to VAV	CONFIGURATION	OCC.H
Configuration	HTSTGTYP	Heat Stage Type	YES	0,1,2,3,4	—	0 - 2 Stages, 1- 5 Stages; 2- 7 Stages, 3 - 9 Stages, 4- 11 Stages	CONFIGURATION	N.HST
Configuration	HTLATMON	SAT Sensor Senses Heat	YES	YES/NO	—	YES/NO	CONFIGURATION	LAT.M
Configuration	GAS_FOD	Fan-off Delay, Gas Heat	YES	XXX	—	45-600	CONFIGURATION	G.FOD
Configuration	ELEC_FOD	Fan-off Delay, Elec Heat	YES	XXX	—	10 TO 600	CONFIGURATION	E.FOD
Configuration	HTRENDLV	Heat Trend Demand Level	YES	X.X	F	0.1 TO 5.0	CONFIGURATION	HT.LV
Configuration	HTRENDTM	Heat Trend Time (secs)	YES	XX	—	30 TO 600	CONFIGURATION	HT.TM

HOLIDAY — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Broadcast Supervisor	HOLDY01S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.1
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.1
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.1
Broadcast Supervisor	HOLDY02S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.2
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.2
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.2
Broadcast Supervisor	HOLDY03S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.3
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.3
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.3
Broadcast Supervisor	HOLDY04S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.4
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.4
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.4
Broadcast Supervisor	HOLDY05S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.5
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.5
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.5
Broadcast Supervisor	HOLDY06S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.6
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.6
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.6
Broadcast Supervisor	HOLDY07S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.7
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.7
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.7
Broadcast Supervisor	HOLDY08S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.8
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.8
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.8

APPENDIX A — CCN POINTS (cont)

HOLIDAY — CONTROLLER (cont)

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Broadcast Supervisor	HOLDY09S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.9
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.9
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.9
Broadcast Supervisor	HOLDY10S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.10
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.10
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.10
Broadcast Supervisor	HOLDY11S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.11
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.11
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.11
Broadcast Supervisor	HOLDY12S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.12
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.12
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.12
Broadcast Supervisor	HOLDY13S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.13
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.13
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.13
Broadcast Supervisor	HOLDY14S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.14
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.14
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.14
Broadcast Supervisor	HOLDY15S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.15
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.15
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.15
Broadcast Supervisor	HOLDY16S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.16
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.16
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.16
Broadcast Supervisor	HOLDY17S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.17
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.17
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.17
Broadcast Supervisor	HOLDY18S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.18
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.18
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.18
Broadcast Supervisor	HOLDY19S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.19
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.19
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.19
Broadcast Supervisor	HOLDY20S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.20
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.20
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.20

APPENDIX A — CCN POINTS (cont)

HOLIDAY — CONTROLLER (cont)

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Broadcast Supervisor	HOLDY21S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.21
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.21
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.21
Broadcast Supervisor	HOLDY22S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.22
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.22
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.22
Broadcast Supervisor	HOLDY23S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.23
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.23
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.23
Broadcast Supervisor	HOLDY24S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.24
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.24
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.24
Broadcast Supervisor	HOLDY25S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.25
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.25
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.25
Broadcast Supervisor	HOLDY26S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.26
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.26
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.26
Broadcast Supervisor	HOLDY27S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.27
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.27
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.27
Broadcast Supervisor	HOLDY28S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.28
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.28
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.28
Broadcast Supervisor	HOLDY29S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.29
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.29
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.29
Broadcast Supervisor	HOLDY30S							
Broadcast Supervisor	HOL-MON	Start Month	YES	XX	months	1 to 12	TIMECLOCK	MTH.30
Broadcast Supervisor	HOL-DAY	Start Day	YES	XX	days	1-31	TIMECLOCK	DAY.30
Broadcast Supervisor	HOL-LEN	Duration (days)	YES	XX	days	1-31	TIMECLOCK	LEN.30

APPENDIX A — CCN POINTS (cont)

OCCDEFCS — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Occupancy Supervisory	OVR-EXT	Timed override hours	YES	X	HRS	0,1,2,3,4		
Occupancy Supervisory	DOW1	Period 1 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.1..SUN.1
Occupancy Supervisory	OCCTOD1	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.1
Occupancy Supervisory	UNOCTOD1	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.1
Occupancy Supervisory	DOW2	Period 2 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.2..SUN.2
Occupancy Supervisory	OCCTOD2	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.2
Occupancy Supervisory	UNOCTOD2	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.2
Occupancy Supervisory	DOW3	Period 3 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.3..SUN.3
Occupancy Supervisory	OCCTOD3	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.3
Occupancy Supervisory	UNOCTOD3	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.3
Occupancy Supervisory	DOW4	Period 4 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.4..SUN.4
Occupancy Supervisory	OCCTOD4	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.4
Occupancy Supervisory	UNOCTOD4	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.4
Occupancy Supervisory	DOW5	Period 5 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.5..SUN.5
Occupancy Supervisory	OCCTOD5	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.5
Occupancy Supervisory	UNOCTOD5	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.5
Occupancy Supervisory	DOW6	Period 6 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.6..SUN.6
Occupancy Supervisory	OCCTOD6	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.6
Occupancy Supervisory	UNOCTOD6	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.6
Occupancy Supervisory	DOW7	Period 7 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.7..SUN.7
Occupancy Supervisory	OCCTOD7	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.7
Occupancy Supervisory	UNOCTOD7	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.7
Occupancy Supervisory	DOW8	Period 8 DOW (MTWTFSSH)	YES	XXXXXXXX	—	MTWTFSSH	TIMECLOCK	MON.8..SUN.8
Occupancy Supervisory	OCCTOD8	Occupied from	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	OCC.8
Occupancy Supervisory	UNOCTOD8	Occupied to	YES	XX:XX	HR:MIN	0 TO 24	TIMECLOCK	UNC.8

SCHEDOVR — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	SCHEDNUM	Schedule Number	YES	XX		0 TO 99	TIMECLOCK	SCHN
Configuration	RMTINCFG	Remote Switch Config	YES	0,1,2		0,1,2	CONFIGURATION	RMT.C
Configuration	HOLIDAYT	Accept Global Holidays?	YES	YES/NO		YES/NO	TIMECLOCK	HOLG
Configuration	OTL	Override Time Limit	YES	X	HOURS	0 TO 4	TIMECLOCK	OTL
Configuration	OVR_EXT	Timed Override Hours	YES	X	HOURS	0 TO 4	—	—
Configuration	SPT_OVER	Accepting an Override: SPT Override Enabled ?	YES	YES/NO	—	YES/NO	TIMECLOCK	OVR.S
Configuration	T58_OVER	Accepting an Override: T58 Override Enabled ?	YES	YES/NO	—	YES/NO	TIMECLOCK	OVR.T
Configuration	GLBLOVER	Allowed to Boradcast a Global Sched. Override?	YES	YES/NO	—	YES/NO	TIMECLOCK	OVR.G

APPENDIX A — CCN POINTS (cont)

SET_PNT — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Setpoint Configuration	OHSP	Occupied Heat Setpoint	YES	XXX.X	F	55.0 TO 80	SETPOINT	OHSP
Setpoint Configuration	OCSP	Occupied Cool Setpoint	YES	XXX.X	F	55.0 TO 80	SETPOINT	OC.SP
Setpoint Configuration	UHSP	Unoccupied Heat Setpoint	YES	XXX.X	F	40.0 TO 80	SETPOINT	UHSP
Setpoint Configuration	UCSP	Unoccupied Cool Setpoint	YES	XXX.X	F	75.0 TO 95.0	SETPOINT	UCSP
Setpoint Configuration	HCSP_GAP	Heat-Cool Setpoint Gap	YES	XXX.X	F	2.0 TO 10	SETPOINT	GAP
Setpoint Configuration	VAVOCON	VAV Occ. Cool On Setpnt	YES	XXX	F	55 TO 85	SETPOINT	V.C.ON
Setpoint Configuration	VAVOCOFF	VAV Occ. Cool Off Delta	YES	XXX	F	1 TO 25	SETPOINT	V.C.OF
Setpoint Configuration	SPSP	Static Pressure Setpoint	YES	XXX.X	in H2O	0 TO 5.0	SETPOINT	SP.SP
Setpoint Configuration	BPSP	Building Pressure Setp.	YES	XX.XX	in H2O	-.25 TO .25	SETPOINT	BP.SP
Setpoint Configuration	SASP	Supply Air Setpoint	YES	XXX.X	F	45.0 TO 75.0	SETPOINT	SA.SP
Setpoint Configuration	SASP_HI	Supply Air Setpoint Hi	YES	XXX.X	F	45.0 TO 75.0	SETPOINT	HI.SA
Setpoint Configuration	SASP_LO	Supply Air Setpoint Lo	YES	XXX.X	F	45.0 TO 75.0	SETPOINT	LO.SA
Setpoint Configuration	SASPHEAT	Heating Supply Air Setpt	YES	XXX.X	F	90 TO 145	SETPOINT	SA.S.H
Setpoint Configuration	SASPTEMP	Temper Supply Air Setpt	YES	XXX.X	F	5 TO 100	SETPOINT	SA.SH
Setpoint Configuration	TEMPCOOL	Tempering in Cool SASP	YES	XXX	—	-20 TO 40.0	CONFIGURATION	T.CL
Setpoint Configuration	TEMPVOCC	Tempering Vent Occ SASP	YES	XXX	—	-20 TO 40.0	CONFIGURATION	T.VO
Setpoint Configuration	TEMPVUNC	Temper Vent Unocc. SASP	YES	XXX	—	-20 TO 40.0	CONFIGURATION	T.VU
Setpoint Configuration	TEMPPURG	Tempering Purge SASP	YES	XXX	—	-20 TO 40.0	CONFIGURATION	T.PRG
Setpoint Configuration	NTLO	Night Time Lockout Temp	YES	XXX.X	F	40.O TO 70.0	SETPOINT	NT.LO
Setpoint Configuration	SARSTCFG	Supply Air Reset Type	YES	0,1,2,3	—	0=NO RESET, 1=SPT RESET, 2=RAT RESET, 3=3RD PART RESET	CONFIGURATION	RST.T
Setpoint Configuration	RTIO	Reset Ratio	YES	XXX.X	—	0.0 TO 10.0	CONFIGURATION	RTIO
Setpoint Configuration	LIMT	Reset Limit	YES	XXX.X	F	0 TO 20.0	CONFIGURATION	R.LIM
Setpoint Configuration	LSP	Demand Limit Setpoint	YES	XXX	%	0 TO 100%	—	—
Setpoint Configuration	ECONOMIN	Economizer Min.Position	YES	XXX	%	0 TO 100%	CONFIGURATION	MIN.P
Setpoint Configuration	IAQMINP	IAQ Demand Vent Min.Pos.	YES	XXX	%	0 TO 100%	CONFIGURATION	AQ.MP
Setpoint Configuration	PE1_POS	PE Stage1 Econo Position	YES	XXX	%	0 TO 100%	CONFIGURATION	PE1.P
Setpoint Configuration	PE2_POS	PE Stage2 Econo Position	YES	XXX	%	0 TO 100%	CONFIGURATION	PE2.P
Setpoint Configuration	OACS	Outside Air CFM Setpoint	YES	XXXX	CFM	NOT USED AT THIS TIME	—	—
Setpoint Configuration	LTMP	IAQ Purge LoTemp Min Pos	YES	XXX	%	0 TO 100%	CONFIGURATION	PG.LT
Setpoint Configuration	HTMP	IAQ Purge HiTemp Min Pos	YES	XXX	%	0 TO 100%	CONFIGURATION	PG.HT
Setpoint Configuration	OADEWCFG	OA Dewpoint Temp Limit	YES	XXX.X	F	50.0 TO 62.0	CONFIGURATION	OA.DL

SFANVFD — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	SPKP	Prop. Gain SF VFD	YES	XX.X	—	0.0 TO 99.9	CONFIGURATION	SP.KP
Configuration	SPKD	Diff. Gain SF VFD	YES	XX.X	—	0 TO 50.0	CONFIGURATION	SP.KD
Configuration	SPKI	Integral Gain SF VFD	YES	X.X	—	0.0 TO 50.0	CONFIGURATION	SP.KI
Configuration	SPK	System Gain SF VFD	YES	X.X	—	0.0 TO 50.0	CONFIGURATION	SP.K
Configuration	VFD_TIME	VFD PID Time (seconds)	YES	X	—	1 TO 200	CONFIGURATION	SP.DT
Configuration	SVFD_MIN	IDF VFD Minimum Speed	YES	XXX	%	LEAVE AT 0%	CONFIGURATION	SF.MN
Configuration	SVFD_MAX	IDF VFD Maximum Speed	YES	XXX	%	0-100%	CONFIGURATION	SF.MX
Configuration	SVFD_FSD	IDF Speed in Fire Mode	YES	XXX	%	0-100%	CONFIGURATION	SF.FS

APPENDIX A — CCN POINTS (cont)

UNIT — CONTROLLER

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Configuration	CTRLTYPE	Unit Control Type	YES	1,2,3,4,5,6	—	1=SPT 2STAGE, 2=SPT MULTI, 3=TSTAT 2STAGE, 4= TSTAT MULTI, 5=VAV RAT, 6=VAV SPT	CONFIGURATION	CTL.T
Configuration	SIZE	Sz (20,25,27,30,35,40,50,60)	YES	XX	TONS	20 TO 60	CONFIGURATION	SIZE
Configuration	VARSFAN	Variable Speed Fan?	YES	YES/NO	—	YES/NO	CONFIGURATION	VS.FN
Configuration	ECON_ENA	Economizer Installed?	YES	YES/NO	—	YES/NO	CONFIGURATION	EC.EQ
Configuration	ECON_CTL	Economizer Control Type	YES	1,2,3	—	1,2,3	CONFIGURATION	E.CTL
Configuration	ECTRMENA	Enable Economizer Trim	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	TRM-E
Configuration	ECOSWCFG	Economizer Switch Config	YES	0,1,2	—	0=NONE, 1=ECON ENABLE, 2=POSITION OVERRIDE	CONFIGURATION	ECO.S
Configuration	MAT_SEL	Estimate MAT?	YES	YES/NO	—	YES/NO	CONFIGURATION	MAT.S
Configuration	RATSENS	Return Air Temp Sensor	YES	Enable/Dsable	—	Enable/Dsable	—	--
Configuration	SPTSENS	Space Temp Sensor	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	SPT.S
Configuration	SPTOSENS	Space Temp Offset	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	STO.S
Configuration	SPTO_RNG	SPT Offset Range (+/-)	YES	XX	F	1 to 10	CONFIGURATION	STO.R
Configuration	SPSENS	Duct Static Press Sensor	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	SP.S
Configuration	BPSENS	Building Static Pressure Sensor	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	BP.S
Configuration	OARHSENS	Outside Air RH Sensor	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	O.RH.S
Configuration	RARHSENS	Return Air RH Sensor	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	R.RH.S
Configuration	EDTRSENS	EDT Reset Input	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	EDT.R
Configuration	DEMLSENS	Demand Limit Input	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	DMT.S
Configuration	FLTS_ENA	Filter Stat.Sw.Enabled?	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	FLS.E
Configuration	DP_TRANS	Discharge Press. Transducer	YES	YES/NO	—	YES/NO	CONFIGURATION	DP.XR
Configuration	HPSP	Head Pressure Setpoint	YES	XXX.X	F	80.0 to 150.0	CONFIGURATION	HP.SP
Configuration	MM_SEL	Motor Master Installed?	YES	YES/NO	—	YES/NO	CONFIGURATION	S.MM
Configuration	DELAY	Minutes Off Time	YES	XX	MIN	0 TO 15	CONFIGURATION	DELY
Configuration	ECB1_BRD	ECB1 Module Installed	YES	YES/NO	—	YES/NO	CONFIGURATION	ECB1
Configuration	ECB2_BRD	ECB2 Module Installed	YES	YES/NO	—	YES/NO	CONFIGURATION	ECB2
Configuration	SCB_BRD	SCB Module Installed	YES	YES/NO	—	YES/NO	CONFIGURATION	SCB
Configuration	EMM_BRD	CEM Module Installed	YES	YES/NO	—	YES/NO	CONFIGURATION	CEM

ALRTLMITS — DIAGNOSITCS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Service Configuration	SPLO	SPT LO Alert Limit/Occ	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SPL.O
Service Configuration	SPHO	SPT HI Alert Limit/Occ	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SPH.O
Service Configuration	SPLU	SPT LO Alert Limit/Unocc	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SPL.U
Service Configuration	SPHU	SPT HI Alert Limit/Unocc	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SPH.U
Service Configuration	SAL	SAT LO Alert Limit/Occ	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SAL.O
Service Configuration	SAH	SAT HI Alert Limit Occ	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SAH.O
Service Configuration	SALU	SAT LO Alert Limit/Unocc	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SAL.U
Service Configuration	SALH	SAT HI Alert Limit/Unocc	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	SAH.U
Service Configuration	RAL	RAT LO Alert Limit/Occ	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	RAL.O
Service Configuration	RAH	RAT HI Alert Limit/Occ	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	RAH.O
Service Configuration	RALU	RAT LO Alert Limit/Unocc	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	RAL.U
Service Configuration	RAHU	RAT HI Alert Limit/Unocc	YES	XXX.X	F	-10.0 TO 245.0	CONFIGURATION	RAH.U
Service Configuration	RHL	RH Low Alert Limit	YES	XXX	%	-10.0 TO 245.0	CONFIGURATION	IRH.L
Service Configuration	RHH	RH High Alert Limit	YES	XXX	%	-10.0 TO 245.0	CONFIGURATION	IRH.H
Service Configuration	SPL	SP Low Alert Limit	YES	X.X	in H2O	0.0 TO 5.0	CONFIGURATION	DP.L
Service Configuration	SPH	SP High Alert Limit	YES	X.X	in H2O	0.0 TO 5.0	CONFIGURATION	DP.H
Service Configuration	BPLO	BP Low Alert Limit	YES	X.XX	in H2O	-.26 TO .26	CONFIGURATION	BP.L
Service Configuration	BPHI	BP High Alert Limit	YES	X.XX	in H2O	-.26 TO .26	CONFIGURATION	BP.H
Service Configuration	IAQL	IAQ High Alert Limit	YES	XXXX	PPM	0 TO 5000	CONFIGURATION	IQ.HI

APPENDIX A — CCN POINTS (cont)

DISLOGIC — DIAGNOSTICS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Service Configuration	FLTSLOGC	Filter Status	YES	Open/Closed	—	Open/Closed	INPUTS	FIL.S
Service Configuration	GASFANLG	IGC Feedback	YES	Open/Closed	—	Open/Closed	INPUTS	GAS.F
Service Configuration	FSDKOGIC	Fireshutdown	YES	Open/Closed	—	Open/Closed	INPUTS	FDWN
Service Configuration	ECOSWLOG	Economizer Switch	YES	Open/Closed	—	Open/Closed	INPUTS	E.ENA
Service Configuration	RMTINLOG	Remote Switch	YES	Open/Closed	—	Open/Closed	INPUTS	RE.MT
Service Configuration	IAQINLOG	IAQ Disc.Input	YES	Open/Closed	—	Open/Closed	INPUTS	I.AQS
Service Configuration	SFSLOGIC	Fan Status Sw.	YES	Open/Closed	—	Open/Closed	INPUTS	FAN.S
Service Configuration	DMD_SW1L	Dmd.Lmt.Sw.1	YES	Open/Closed	—	Open/Closed	INPUTS	DLM.1
Service Configuration	DMD_SW2L	Dms.Lmt.Sw2	YES	Open/Closed	—	Open/Closed	INPUTS	DLM.2
Service Configuration	PRESLOGC	Press. Switch	YES	Open/Closed	—	Open/Closed	INPUTS	F.PRS
Service Configuration	EVACLOGC	Evaculation Sw.	YES	Open/Closed	—	Open/Closed	INPUTS	F.EVC
Service Configuration	PURGLOGC	Smoke Purge Sw.	YES	Open/Closed	—	Open/Closed	INPUTS	F.PRG

SENSCNFG — DIAGNOSITCS

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Service Configuration	SPT_TRIM	SPT Trim	YES	XXX.X	F	-10.0 TO 10.0	TEMPERATURES	SPT.T
Service Configuration	SAT_TRIM	SAT Trim	YES	XXX.X	F	-10.0 TO 10.0	TEMPERATURES	SAT.T
Service Configuration	OAT_TRIM	OAT Trim	YES	XXX.X	F	-10.0 TO 10.0	TEMPERATURES	OAT.T
Service Configuration	RAT_TRIM	RAT Trim	YES	XXX.X	F	-10.0 TO 10.0	TEMPERATURES	RAT.T
Service Configuration	SGT_TRIM	Staged Gas LAT Avg Trim	YES	XXX.X	F	-30.0 T0 30.0	TEMPERATURES	SGT.T
Service Configuration	CTA_TRIM	Condensing Temp A Trim	YES	XXX.X	F	-30.0 T0 30.0	TEMPERATURES	CTA.T
Service Configuration	CTB_TRIM	Condensing Temp B Trim	YES	XXX.X	F	-30.0 T0 30.0	TEMPERATURES	CTB.T
Service Configuration	SPA_TRIM	Suction Pressure A Trim	YES	XXX.X	PSI	-50.0 TO 50.0	PRESSURES	SP.A.T
Service Configuration	SPB_TRIM	Suction Pressure B Trim	YES	XXX.X	PSI	-50.0 TO 50.0	PRESSURES	SP.B.T
Service Configuration	DPA_TRIM	Dischrg Pressure A Trim	YES	XXX.X	PSI	-50.0 TO 50.0	—	—
Service Configuration	DPB_TRIM	Dischrg Pressure B Trim	YES	XXX.X	PSI	-50.0 TO 50.0	—	—
Service Configuration	BP_TRIM	Building Pressure Trim	YES	XX.XX	in H2O	-10.0 TO 10.0	PRESSURES	BP.T
Service Configuration	BP_RANGE	Bldg Press (+/-) Range	YES	XX.XX	in H2O	0 TO 1.00	CONFIGURATION	BP.R
Service Configuration	SP_TRIM	Static Press Trim	YES	XX.XX	in H2O	-10.0 TO 10.0	PRESSURES	DSP.T
Service Configuration	SP_LOW	Duct Press Sensor Lo End	YES	XXX.XX	—	-10.0 TO 10.0	CONFIGURATION	SP.L.L
Service Configuration	SP_HIGH	Duct Press Sensor Hi End	YES	XXX.XX	—	-10.0 TO 10.0	CONFIGURATION	SP.H.L

APPENDIX A — CCN POINTS (cont)

AIRQUALT — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	OAQLOCK	OAQ Lockout Value	YES	XXXX	PPM	0 TO 2000	CONFIGURATION	OAQ.L
Maintenance Display	IAQINCFG	IAQ Discrete Input Confg	YES	0,1,2	—	0=NO IAQ, 1=DCV, 2=OVERRIDE IAQ		
Maintenance Display	IAQOVPOS	IAQ Econo Override Pos.	YES	XXX	%	0 TO 100%	CONFIGURATION	OVR.P
Maintenance Display	IAQANCFG	IAQ Minpos Sensor Config	YES	0,1,2,3,4	—	0=MIN POS POT, 1=CNTL MIN POS, 2=OVERRIDE IAQ, 3=DCV, 4=NO IAQ	CONFIGURATION	IA.CF
Maintenance Display	IAQINFAN	IAQ Disc.In. Fan Config	YES	0,1,2	—	0=NEVER, 1=OCCUPIED, 2=ALWAYS	CONFIGURATION	IA.IF
Maintenance Display	IAQANFAN	IAQ 4-20 ma Fan Config	YES	0,1,2	—	0=NEVER, 1=OCCUPIED, 2=OVERRIDE IAQ	CONFIGURATION	IA.FN
Maintenance Display	OAQANCFG	OAQ 4-20ma Sensor Config	YES	0,1,2	—	0=NO OAQ, 1=DCV OAQ, 2=LOKOUT	CONFIGURATION	OA.CF
Maintenance Display	IAQREACT	Diff .IAQ Responsiveness	YES	XX	—	-5.0 to 5.0	CONFIGURATION	I.CRV
Maintenance Display	DAQ	Diff.Air Quality in PPM	NO	XXXX	—		—	—
Maintenance Display	DAQ_LOW	Diff.Air Quality LoLimit	YES	XXXX	PPM	0 TO 1000	CONFIGURATION	AQD.L
Maintenance Display	DAQ_HIGH	Diff .Air Quality HiLimit	YES	XXXX	PPM	0 TO 2000	CONFIGURATION	AQD.H
Maintenance Display	DAQFNOFF	DAQ PPM Fan Off Setpoint	YES	XXXX	PPM	0 TO 2000	CONFIGURATION	DF.OF
Maintenance Display	DAQFNON	DAQ PPM Fan On Setpoint	YES	XXXX	PPM	O TO 2000	CONFIGURATION	DF.ON
Maintenance Display	IAQMINP	IAQ Demand Vent Min.Pos.	YES	XXX	%	0 TO 100%	CONFIGURATION	AQ.MP
Maintenance Display	ECONOMIN	Economizer Min.Position	YES	XXX	%	0 TO 100%	CONFIGURATION	MIN.P
Maintenance Display	IAQREFL	IAQ Low Reference	YES	XXXX	PPM	0 TO 5000	CONFIGURATION	I.4M
Maintenance Display	IAQREFH	IAQ High Reference	YES	XXXX	PPM	0 TO 5000	CONFIGURATION	I.20M
Maintenance Display	OAQREFL	OAQ Low Reference	YES	XXXX	PPM	0 TO 5000	—	—
Maintenance Display	OAQREFH	OAQ High Reference	YES	XXXX	PPM	0 TO 5000	—	—
Maintenance Display	IAQ_MA	IAQ milliamps	YES	XX.XX	mA	0 TO 20.0	—	—
Maintenance Display	OAQ_MA	OAQ milliamps	YES	XX.XX	mA	0 TO 20.0	—	—
Maintenance Display	IAQ	IAQ - PPM Return CO2	YES	XXXX	PPM	0 TO 5000	—	—
Maintenance Display	IAQMINOV	Econ Min. Pos. Override	YES	XXX	%	0 TO 100%	—	—
Maintenance Display	OAQ	OAQ - PPM Return CO2	YES	XXXX	PPM	0 TO 5000	—	—
Maintenance Display	IAQIN	IAQ Discrete Input	YES	Low/High	—	Low/High	INPUTS	I.AQS
Maintenance Display	MIN_POS	Econo Current Min. Pos.	NO	XXX	%		INPUTS	E.MPO
Maintenance Display	IAQL	IAQ Low Alert limit	YES	XXXX	PPM	0 TO 5000	—	—
Maintenance Display	IAQH	IAQ high alert limit	YES	XXXX	PPM	0 TO 5000	—	—
Maintenance Display	PURG	Smoke Purge Input	YES	ON/OFF	—	ON/OFF	INPUTS	F.PRG
Maintenance Display	PURGEN	IAQ Purge	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	PRG.E

APPENDIX A — CCN POINTS (cont)

ALARMS — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	ALARM01C	Active Alarm #1	YES	AXXX	—	Alarms are shown as AXXX Alerts are shown as TXXX, Prealerts are shown as PXXX	—	—
Maintenance Display	ALARM02C	Active Alarm #2	YES	AXXX	—		—	—
Maintenance Display	ALARM03C	Active Alarm #3	YES	AXXX	—		—	—
Maintenance Display	ALARM04C	Active Alarm #4	YES	AXXX	—		—	—
Maintenance Display	ALARM05C	Active Alarm #5	YES	AXXX	—		—	—
Maintenance Display	ALARM06C	Active Alarm #6	YES	AXXX	—		—	—
Maintenance Display	ALARM07C	Active Alarm #7	YES	AXXX	—		—	—
Maintenance Display	ALARM08C	Active Alarm #8	YES	AXXX	—		—	—
Maintenance Display	ALARM09C	Active Alarm #9	YES	AXXX	—		—	—
Maintenance Display	ALARM10C	Active Alarm #10	YES	AXXX	—		—	—
Maintenance Display	ALARM11C	Active Alarm #11	YES	AXXX	—		—	—
Maintenance Display	ALARM12C	Active Alarm #12	YES	AXXX	—		—	—
Maintenance Display	ALARM13C	Active Alarm #13	YES	AXXX	—		—	—
Maintenance Display	ALARM14C	Active Alarm #14	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #15	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #16	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #17	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #18	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #19	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #20	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #21	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #22	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #23	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #24	YES	AXXX	—		—	—
Maintenance Display	ALARM15C	Active Alarm #25	YES	AXXX	—		—	—

ANALOGIN — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	DP_A	Cir A Discharge Pressure	NO	XXX.X	PSIG	0 to 450 psig	PRESSURES	SCP.A
Maintenance Display	SCTA	Cir A Sat Condensing Tmp	NO	XXX.X	F	-40 to 240	TEMPERATURES	SCT.A
Maintenance Display	DP_B	Cir B Discharge Pressure	NO	XXX.X	PSIG	0 to 450 psig	PRESSURES	SCP.B
Maintenance Display	SCTB	Cir B Sat Condensing Tmp	NO	XXX.X	F	-40 to 240	TEMPERATURES	SCT.B
Maintenance Display	SP_A	Cir A Suction Pressure	NO	XXX.X	PSIG	0 to 450 psig	PRESSURES	SSP.A
Maintenance Display	SSTA	Cir A Sat Suction Temp	NO	XXX.X	F	-40 to 240	TEMPERATURES	SST.A
Maintenance Display	SP_B	Cir B Suction Pressure	NO	XXX.X	PSIG	0 to 450 psig	PRESSURES	SSP.B
Maintenance Display	SSTB	Cir B Sat Suction Temp	NO	XXX.X	F	-40 to 240	TEMPERATURES	SST.B
Maintenance Display	RAT	Return Air Temperature	NO	XXX.X	F	-40 to 240	TEMPERATURES	RAT
Maintenance Display	SAT	Air Leaving Supply Fan	NO	XXX.X	F	-40 to 240	—	—
Maintenance Display	OAT	Outside Air Temperature	NO	XXX.X	F	-40 to 240	TEMPERATURES	OAT
Maintenance Display	SPT	Space Temperature	NO	XXX.X	F	-40 to 240	TEMPERATURES	SPT
Maintenance Display	SPT0	Space Temperature Offset	NO	XXX.X	F	-40 to 240	TEMPERATURES	SPT0
Maintenance Display	IAQ	IAQ - PPM Indoor Level	NO	XXXX	PPM	0 to 5000	—	—
Maintenance Display	BP	Building Pressure	NO	X.XXX	IN H2O	-26 to +.26	PRESSURES	BLDG
Maintenance Display	SP	Duct Static Pressure	NO	X.XXX	IN H2O	0 to 5	PRESSURES	DUCT
Maintenance Display	LAT1SGAS	Staged Gas LAT 1	NO	XXX.X	F	-40 to 240	TEMPERATURES	LAT.1
Maintenance Display	LAT2SGAS	Staged Gas LAT 2	NO	XXX.X	F	-40 to 240	TEMPERATURES	LAT.2
Maintenance Display	LAT3SGAS	Staged Gas LAT 3	NO	XXX.X	F	-40 to 240	TEMPERATURES	LAT.3
Maintenance Display	DMDLMTMA	4-20 ma Demand Signal	NO	XX.XX	mA	0 to 20 ma	INPUTS	DM.AI
Maintenance Display	OAQ	OAQ - PPM Outdoor CO2	NO	XXXX	PPM	0 to 5000	—	—
Maintenance Display	OARH	Outside Air Rel.Humdity	NO	XXX.X	%	0 TO 100%	INPUTS	OA.RH
Maintenance Display	RARH	Return Air Rel.Humidity	NO	XXX.X	%	0 TO 100%	INPUTS	RA.RH

APPENDIX A — CCN POINTS (cont)

COMPWORK — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	CMPA1	Compressor A1	NO	ON/OFF	—	ON/OFF	OUTPUTS	A1
Maintenance Display	CSB_A1	Compressor A1 Feedback	NO	ON/OFF	—	ON/OFF	INPUTS	CS.A1
Maintenance Display	CSBA1ASC	Cur.Sens.Brd A1 Status	YES	Enable/Disabled	—	Enable/Disabled	CONFIGURATION	A1.C.E
Maintenance Display	CSB_A1EN	CSB A1 Feedback Alarm	YES	Enable/Dsable		Enable/Dsable	—	—
Maintenance Display	CMPA1LOK	Comp A1 Locked Out ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	CMPA1STR	Compressor A1 Strikes	NO	X	—	0,1,2,3	—	—
Maintenance Display	CMPA1ENA	Enable Compressor A1	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	A1.EN
Maintenance Display	CMPA2	Compressor A2	NO	ON/OFF	—	ON/OFF	OUTPUTS	A2
Maintenance Display	CSB_A2	Compressor A2 Feedback	NO	ON/OFF	—	ON/OFF	INPUTS	CS.A2
Maintenance Display	CSBA2ASC	Cur.Sens.Brd A2 Status	YES	Enable/Disabled	—	Enable/Disabled	CONFIGURATION	A2.C.E
Maintenance Display	CSB_A2EN	CSB A2 Feedback Alarm	YES	Enable/Dsable		Enable/Dsable	—	—
Maintenance Display	CMPA2LOK	Comp A2 Locked Out ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	CMPA2STR	Compressor A2 Strikes	NO	X	—	0,1,2,3	—	—
Maintenance Display	CMPA2ENA	Enable Compressor A2	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	A2.EN
Maintenance Display	CMPB1	Compressor B1	NO	ON/OFF	—	ON/OFF	OUTPUTS	B1
Maintenance Display	CSB_B1	Compressor B1 Feedback	NO	ON/OFF	—	ON/OFF	INPUTS	CS.B1
Maintenance Display	CSBB1ASC	Cur.Sens.Brd B1 Status	YES	Enable/Disabled	—	Enable/Disabled	CONFIGURATION	B1.C.E
Maintenance Display	CSB_B1EN	CSB B1 Feedback Alarm	YES	Enable/Dsable		Enable/Dsable	—	—
Maintenance Display	CMPB1LOK	Comp B1 Locked Out ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	CMPB1STR	Compressor B1 Strikes	NO	X	—	0,1,2,3	—	—
Maintenance Display	CMPB1ENA	Enable Compressor B1	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	B1.EN
Maintenance Display	VMPB2	Compressor B2	NO	ON/OFF	—	ON/OFF	OUTPUTS	B2
Maintenance Display	CSB_B2	Compressor B2 Feedback	NO	ON/OFF	—	ON/OFF	INPUTS	CS.B2
Maintenance Display	CSBB2AC	Cur.Sens.Brd B2 Status	YES	Enable/Disabled	—	Enable/Disabled	CONFIGURATION	B2.C.E
Maintenance Display	CSB_B2EN	CSB B2 Feedback Alarm	YES	Enable/Dsable		Enable/Dsable	—	—
Maintenance Display	CMPB2LOK	Comp B2 Locked Out ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	CMPB2STR	Compressor B2 Strikes	NO	X	—	0,1,2,3	—	—
Maintenance Display	CMPB2ENA	Enable Compressor B2	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	B2.EN
Maintenance Display	ALRESET	Reset All Current Alarms	YES	YES/NO	—	YES/NO	ALARMS	R.CURR

DMDLIMIT — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	DEM_LIM	Active Demand Limit	YES	XXX	%	0 TO 100%	INPUTS	DM.AI
Maintenance Display	DMD_CTRL	Demand Limit Select	YES	0,1,2,3	—	0=NO DEMAND LIMIT, 1=SWITCH, 2=4-20MA, 3=CCN LOADSHED	CONFIGURATION	DMLS
Maintenance Display	CAP_T	Percent Total Capacity	NO	XXX	%	0-100%	—	—
Maintenance Display	DMD_SW1	Demand Limit Switch 1	YES	ON/OFF	—	ON/OFF	CONFIGURATION	DLS.1
Maintenance Display	DMD_SW2	Demand Limit Switch 2	YES	ON/OFF	—	ON/OFF	CONFIGURATION	DLS.2
Maintenance Display	DLSWSP1	Demand Limit Sw.1 Setpt	YES	XXX	%	0-100%	INPUTS	DLM.1
Maintenance Display	DLSWSP2	Demand Limit Sw.2 Setpt	YES	XXX	%	0-100%	INPUTS	DLM.2
Maintenance Display	DMDLMTMA	4-20 ma Demand signal	YES	X.XX	ma	0 TO 20	—	—
Maintenance Display	DMT20MA	Demand Limit at 20 mA	YES	XXX	%	0-100%	CONFIGURATION	DL20
Maintenance Display	DEMLSENS	Demand Limit Input	YES	Enable/Dsable	—	Enable/Dsable	CONFIGURATION	DMT.S
Maintenance Display	DL_STAT	CCN Loadshed Signal	NO	X	—	ON/OFF	—	—
Maintenance Display	SHED_NUM	Loadshed Group Number	YES	XX	—	0 TO 99	CONFIGURATION	LS.GN
Maintenance Display	SHED_DEL	Loadshed Demand Delta	YES	XX	%	0 TO 60	CONFIGURATION	LS.DD
Maintenance Display	SHED_TIM	Maximum Loadshed Time	YES	XXX	min	0 TO 120	CONFIGURATION	LS.TM

APPENDIX A — CCN POINTS (cont)

ECONDIAG — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	ECATIVE	Economizer Active ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	ECONOENBL	Remote Economizer Enable	YES	ON/OFF	—	ON/OFF	INPUTS	E.ENA
Maintenance Display	ECON_HTH	Economier heathy ?	YES	YES/NO	—	YES/NO	—	—
Maintenance Display	ECOORIDE	Econo Position Override	YES	ON/OFF	—	ON/OFF	INPUTS	E.OVR
Maintenance Display	DBC_STAT	DBC - OAT lockout ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	DEW_STAT	DEW - OA Dewpt.lockout?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	DDBCSTAT	DDBC- OAT > RAT lockout?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	OAECSTAT	OAEC- OA Enth Lockout?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	DEC_STAT	DEC - Diff.Enth.Lockout?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	EDT_STAT	EDT Sensor Bad?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	OAT_STAT	OAT Sensor Bad ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	ECONFORC	Economizer foreced ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	SFONSTAT	Supply Fan not on 30s ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	COOL_OFF	Cool Mode not in effect?	YES	YES/NO	—	YES/NO	—	—
Maintenance Display	OAQLOCKD	OAQ lockout in effect ?	YES	YES/NO	—	YES/NO	—	—
Maintenance Display	ECONHELD	Econ recovery hold off ?	YES	YES/NO	—	YES/NO	—	—
Maintenance Display	RAT_LOW	Return Temp too low ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	OAT_STAT	Outside Air Temperature	YES	XXX.X	F	-40 TO 240	INPUTS	OAT
Maintenance Display	OADEWTMP	Outsideair DewPoint Temp	NO	XXX.X	F	0 TO 100	—	—
Maintenance Display	OARH	Outside Air Rel.Humidity	YES	XXX.X	%	0 TO 100%	INPUTS	OA.RH
Maintenance Display	OAE	Outdoor Enthalpy	NO	XX.XX	BTU/LB	10 TO 50	INPUTS	OA.E
Maintenance Display	RAT	Return Air Temperature	YES	XXX.X	F	-40 TO 240	TEMPERATURES	RAT
Maintenance Display	RARH	Return Air RelHumidity	YES	XXX.X	%	0 TO 100%	INPUTS	RA.RH
Maintenance Display	RAE	Return Air Enthalpy	NO	XX.XX	BTU/LB	10 TO 50	INPUTS	RA.E
Maintenance Display	OAT_LOCK	High OAT Lockout Temp	YES	XXX.X	F	55 TO 120	CONFIGURATION	OAT.L
Maintenance Display	ECON_SEL	Econ ChangeOver Select	YES	0,1,23	—	0=DRY BULB, 1=DIFF. DB, 2=OA ENTHALPY, 3=DIFF ENTHALPY	CONFIGURATION	E.CGO
Maintenance Display	OAEC_SEL	A,B,C,D Curve Select	YES	0,1,2,3,4	—	0=A CURVE, 1=B CURVE, 2=C CURVE, 3=D CURVE, 4=CUSTOM CURVE	CONFIGURATION	OA.EC
Maintenance Display	OAEN_CFG	Outdr.Enth Compare Value	YES	XX.X	BUT/LB	18.0 TO 28.0	CONFIGURATION	OA.EN
Maintenance Display	OADEWCFG	OA Dewpoint Temp Limit	YES	XX.X	F	50.0 TO 62.0	CONFIGURATION	OA.DL
Maintenance Display	SFAN	Supply Fan State	YES	ON/OFF	—	ON/OFF	OUTPUTS	S.FAN
Maintenance Display	ECONOCMD	Econo Damper Command Pos	YES	XXX	%	0 TO 100%	OUTPUTS	E.PWR
Maintenance Display	ECONOPOS	Econo Damper Current Pos	NO	XXX	%	0 TO 100%	OUTPUTS	EC.AP
Maintenance Display	ECONCPNT	Economizer Control Point	YES	XXX	%	0 TO 100%	—	—
Maintenance Display	MAT_SEL	Estimate MAT?	YES	YES/NO	—	YES/NO	CONFIGURATION	MAT.S
Maintenance Display	MAT	Mixed Air Temperature	YES	XXX.X	F	-40 TO 240	TEMPERATURES	MAT
Maintenance Display	EDT_STAT	Evaporator Discharge Tmp	YES	XXX.X	F	-40 TO 240	TEMPERATURES	EDT
Maintenance Display	LAT	Leaving Air Temperature	YES	XXX.X	F	-40 TO 240	TEMPERATURES	LAT

APPENDIX A — CCN POINTS (cont)

ECONMIN — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	ECONOCMD	Econo Damper Command Pos	YES	XXX	%	0 to 100%	OUTPUTS	E.PWR
Maintenance Display	ECONOPOS	Econo Damper Current Pos	NO	XXX	%	0 to 100%	OUTPUTS	EC.AP
Maintenance Display	MIN_POS	Econo Current Min. Pos.	NO	XXX	%	0 to 100%	INPUT MENU	E.MPO
Maintenance Display	ECONOMIN	Economizer Min.Position	YES	XXX	%	0 to 100%	CONFIGURATION	MIN.P
Maintenance Display	ECOORIDE	Econo Position Override	YES	ON/OFF	—	ON/OFF	INPUT MENU	E.OVR
Maintenance Display	IAQMINOV	Econ Min. Pos. Override	YES	XXX	%	0 to 100%	—	—
Maintenance Display	ECON_POT	Econ Remote 10K Pot Val.	YES	XXXXX	OHMS	0 TO 10000	—	—
Maintenance Display	IAQ	IAQ - PPM Indoor CO2	YES	XXXXX	PPM	0 TO 5000	INPUT MENU	IAQ
Maintenance Display	OAQ	OAQ - PPM Outdoor CO2	YES	XXXXX	PPM	0 TO 5000	—	—
Maintenance Display	IAQIN	IAQ - Discrete Input	YES	High/Low	—	High/Low	INPUT MENU	OAQ
Maintenance Display	IAQMINP	IAQ Demand Vent Min.Pos.	YES	XXX	%	0 TO 100%	CONFIGURATION	AQ.MP
Maintenance Display	IAQNCFG	IAQ Minpos Sensor Config	YES	0,1,2,3,4	—	0=MIN POS POT, 1=CNTL MIN POS, 2=OVERRIDE IAQ, 3=DCV, 4=NO IAQ	CONFIGURATION	IA.CF
Maintenance Display	IAQANFAN	IAQ 4-20 ma Fan Config	YES	0,1,2	—	0=NEVER, 1=OCCUPIED, 2=OVERRIDE IAQ	CONFIGURATION	IA.FN
Maintenance Display	IAQINCFG	IAQ Discrete Input Config	YES	0,1,2	—	0=NO IAQ, 1=DCV, 2=OVERRIDE IAQ	CONFIGURATION	IA.I.C
Maintenance Display	IAQINFAN	IAQ Disc.In. Fan Config	YES	0,1,2	—	0=NEVER, 1=OCCUPIED, 2=ALWAYS	CONFIGURATION	IA.IF
Maintenance Display	IAQOVPOS	IAQ Econo Override Pos.	YES	XXX	%	0 TO 100%	CONFIGURATION	OVR.P
Maintenance Display	DAQ	Diff.Air Quality in PPM	NO	XXXX	PPM	0 TO 2000	—	—
Maintenance Display	DAQ_LOW	Diff.Air Quality LoLimit	YES	XXXX	PPM	0 TO 1000	CONFIGURATION	AQD.L
Maintenance Display	DAQ_HIH	Diff.Air Quality HiLimit	YES	XXXX	PPM	0 TO 2000	CONFIGURATION	AQD.H
Maintenance Display	DAQFNOFF	DAQ PPM Fan Off Setpoint	YES	XXXX	PPM	0 TO 2000	CONFIGURATION	DF.OF
Maintenance Display	FAQFNON	DAQ PPM Fan On Setpoint	YES	XXXX	PPM	0 TO 2000	CONFIGURATION	DF.ON
Maintenance Display	IAQREACT	Diff.IAQ Responsiveness	YES	X.X	—	-5.0 to 5.0	CONFIGURATION	I.CRV
Maintenance Display	IAQREFL	IAQ Low Reference	YES	XXXX	—	0 TO 5000	CONFIGURATION	I.4M
Maintenance Display	IAQREFH	IAQ High Reference	YES	XXXX	PPM	0 TO 5000	CONFIGURATION	I.20M
Maintenance Display	OAQLOCK	OAQ Lockout Value	YES	XXXX.X	PPM	0 TO 2000	CONFIGURATION	OAQ.L
Maintenance Display	OAQANCFG	OAQ 4-20ma Sensor Config	YES	0,1,2	—	NO OAQ, DCV OAQ, LOKOUT	CONFIGURATION	OA.CF
Maintenance Display	IAQ_MA	IAQ milliamps	YES	XX.XX	mA	0 to 20	—	—
Maintenance Display	OAQ_MA	OAQ milliamps	YES	XX.XX	mA	0 to 20	—	—

EDT_WORK — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	OAT	Outside Air Temperature	YES	XXX.X	F	-40.0 TO 240.0	TEMPERATURES	OAT
Maintenance Display	EDT	Evaporator DischargeTmp	NO	XXX.X	F		TEMPERATURES	EDT
Maintenance Display	LAT	Leaving Air Temperature	NO	XXX.X	F		TEMPERATURES	LAT
Maintenance Display	MAT	Mixed Air Temperature	YES	XXX.X	F	-40.0 TO 240.0	TEMPERATURES	MAT
Maintenance Display	RSETMATT	Reset MAT Table?	YES	YES/NO	—		CONFIGURATION	R.MAT
Maintenance Display	LAT_SGAS	Staged Gas LAT Sum	YES	XXX.X	F	-40.0 TO 240.0		
Maintenance Display	LAT1SGAS	Staged Gas LAT 1	YES	XXX.X	F	-40.0 TO 240.0	TEMPERATURES	LAT.1
Maintenance Display	LAT2SGAS	Staged Gas LAT 2	YES	XXX.X	F	-40.0 TO 240.0	TEMPERATURES	LAT.2
Maintenance Display	LAT3SGAS	Staged Gas LAT 3	YES	XXX.X	F	-40.0 TO 240.0	TEMPERATURES	LAT.3

APPENDIX A — CCN POINTS (cont)

INPUTS — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	FLTS	Filter Status Input	YES	Clean/Dirty	—	Clean/Dirty	INPUTS	FIL.S
Maintenance Display	GASFAN	Fan request from IGC	YES	On/Off	—	On/Off	INPUTS	GAS.F
Maintenance Display	FSD	Fire Shtdown Input	YES	On/Off	—	On/Off	INPUTS	FDWN
Maintenance Display	G	Thermostat G Input	YES	On/Off	—	On/Off	INPUTS	G
Maintenance Display	W2	Thermostat W2 Input	YES	On/Off	—	On/Off	INPUTS	W2
Maintenance Display	W1	Thermostat W! Input	YES	On/Off	—	On/Off	INPUTS	W1
Maintenance Display	Y2	Thermostat Y2 Input	YES	On/Off	—	On/Off	INPUTS	Y2
Maintenance Display	Y1	Thermostat Y1 Input	YES	On/Off	—	On/Off	INPUTS	Y1
Maintenance Display	ECOSW	Economizer Control Input	YES	On/Off	—	On/Off	INPUTS	RE.MT
Maintenance Display	ECONENBL	Remote Economizer Enable	YES	On/Off	—	On/Off	INPUTS	E.ENA
Maintenance Display	ECOORIDE	Econo Position Override	YES	On/Off	—	On/Off	INPUTS	E.OVR
Maintenance Display	RMTIN	Remote Input	YES	On/Off	—	On/Off	INPUTS	RE.MT
Maintenance Display	IAIN	IAQ - Discrete Input	YES	Low/High	—	Low/High	INPUTS	I.AQS
Maintenance Display	SFS	Supply Fan Status Input	YES	On/Off	—	On/Off	INPUTS	FAN.S
Maintenance Display	DMD_SW1	Deamdn Limit Switch 1	YES	On/Off	—	On/Off	CONFIGURATION	DLS.1
Maintenance Display	DMD_S2	Demand Limit Switch 2	YES	On/Off	—	On/Off	CONFIGURATION	DLS.2
Maintenance Display	PRES	Pressurization Input	YES	On/Off	—	On/Off	CONFIGURATION	F.PRS
Maintenance Display	EVAC	Evacuation Purge Inpute	YES	On/Off	—	On/Off	CONFIGURATION	F.EVC
Maintenance Display	PURG	Smoke Purge Input	YES	On/Off	—	On/Off	CONFIGURATION	F.PRG

LINKDEFM — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	SUPE-ADR	Supervisory Element #	NO	XX	—	0-99	—	—
Maintenance Display	SUPE-BUS	Supervisory Bus	NO	XX	—	0-99	—	—
Maintenance Display	BLOCKNUM	Supervisory Block Number	NO	XX	—	0-99	—	—
Maintenance Display	AOHS	Average Occup. Heat Stp.	NO	XXX.X	F	40 TO 80	—	—
Maintenance Display	AOCS	Average Occup. Cool Stp.	NO	XXX.X	F	55 TO 80	—	—
Maintenance Display	AUHS	Average Unocc. Cool Stp.	NO	XXX.X	F	55 TO 80	—	—
Maintenance Display	AUCS	Average Unocc. Heat Stp.	NO	XXX.X	F	40 TO 80	—	—
Maintenance Display	AZT	Average Zone Temperature	NO	XXX.X	F	40 TO 80	—	—
Maintenance Display	AOZT	Average Occup. Zone Temp	NO	XXX.X	F	40 TO 80	—	—
Maintenance Display	LOCC	Linkage System Occupied?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	LNEXTOCD	Next Occupied Day	NO	XXXX	DOW	1 to 31	—	—
Maintenance Display	LNEXTOCC	Next occupied Time	NO	XX:XX	HR:MIN	00:00 TO 24:00	—	—
Maintenance Display	LNEXTUOD	Next Unoccupied Day	NO	XXXX	DOW	MON, TUES, ….	—	—
Maintenance Display	LNEXTUNC	Next Unoccupied Time	NO	XX:XX	HR:MIN	00:00 TO 24:00	—	—
Maintenance Display	LLASTUOD	Last Unoccupied Day	NO	XXXX	DOW	MON, TUES, ….	—	—
Maintenance Display	LLASTUNC	Last Unoccupied Time	NO	XX:XX	HR:MIN	00:00 TO 24:00	—	—

APPENDIX A — CCN POINTS (cont)

MODES — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	MODECOOL	Cool Mode	NO	ON/OFF	—	ON/OFF	OPERATING MODES	COOL
Maintenance Display	MODEHEAT	Heat Mode	NO	ON/OFF	—	ON/OFF	OPERATING MODES	HEAT
Maintenance Display	MODEVENT	Vent Mode	NO	ON/OFF	—	ON/OFF	OPERATING MODES	VENT
Maintenance Display	MODETEMP	Supply Air Tempering	NO	ON/OFF	—	ON/OFF	OPERATING MODES	—
Maintenance Display	MODEOCCP	Currently Occupied	NO	ON/OFF	—	ON/OFF	OPERATING MODES	OCC
Maintenance Display	MODETOVR	Timed Override in effect	NO	ON/OFF	—	ON/OFF	OPERATING MODES	T.OVR
Maintenance Display	MODEADCV	DCV restting min pos	NO	ON/OFF	—	ON/OFF	OPERATING MODES	A.DCV
Maintenance Display	MODESARS	Supply air Reset	NO	ON/OFF	—	ON/OFF	OPERATING MODES	SAT.R
Maintenance Display	MODEDMLT	Demand Limit in Effect	NO	ON/OFF	—	ON/OFF	OPERATING MODES	DMD.L
Maintenance Display	MODETCST	Temp.Compensated Start	NO	ON/OFF	—	ON/OFF	OPERATING MODES	T.C.ST
Maintenance Display	MODEIQPG	IAQ pre-occ purge active	NO	ON/OFF	—	ON/OFF	OPERATING MODES	IAQ.P
Maintenance Display	MODEUEFC	Uocc Ecn Free Cooling	NO	ON/OFF	—	ON/OFF	OPERATING MODES	F.CL
Maintenance Display	MODEFIRE	Fire Shutdown	NO	ON/OFF	—	ON/OFF	OPERATING MODES	F.SD
Maintenance Display	MODEPRES	Pressurization	NO	ON/OFF	—	ON/OFF	OPERATING MODES	PRES
Maintenance Display	MODEEVAC	Evacuation	NO	ON/OFF	—	ON/OFF	OPERATING MODES	EVAC
Maintenance Display	MODESMKP	Smoke Purge	NO	ON/OFF	—	ON/OFF	OPERATING MODES	SMK.P
Maintenance Display	MODESTAT	Thermostat Control	NO	ON/OFF	—	ON/OFF	OPERATING MODES	STAT
Maintenance Display	MODELINK	Linkage Active - DAV	NO	ON/OFF	—	ON/OFF	OPERATING MODES	LINK
Maintenance Display	MODETEST	Test Mode Active	NO	ON/OFF	—	ON/OFF	OPERATING MODES	TEST
Maintenance Display	MODEFSOV	Fire Speed Override	NO	ON/OFF	—	ON/OFF	OPERATING MODES	FS.OV

OCCDEFME — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	TIMEDATE	Current Day,Time & Date:	NO	Day:Time:Date	—	Day:Time:Date	TIMECLOCK	—
Maintenance Display	OCDFTXT1	Occupancy Controlled By:	NO	Text	—	text	—	—
Maintenance Display	OCDFTXT2	Occupancy Controlled By:	NO	Text	—	text	—	—
Maintenance Display	OCDFTXT3	Occupancy Controlled By:	NO	Text	—	text	—	—
Maintenance Display	MODE_OCC	Currently Occupied ?	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	STARTTIME	Current Occupied Time	NO	XX:XX	HRS:MIN	00:01 to 24:00	—	—
Maintenance Display	ENDTIME	Current Unoccupied Time	NO	XX:XX	HRS:MIN	00:01 to 24:00	—	—
Maintenance Display	NXTOC_DT	Next Occupied Day & Time	NO	DOW:TIME	DOW:HR:MIN	DOW + 00:01 to 24:00	—	—
Maintenance Display	NXTUN_DT	Next Unocc. Day & time	NO	DOW:TIME	DOW:HR:MIN	DOW + 00:01 to 24:00	—	—
Maintenance Display	PRVUN_DT	Last Unocc. Day & Time	NO	DOW:TIME	DOW:HR:MIN	DOW + 00:01 to 24:00	—	—
Maintenance Display	PER_NO	Current Occup. Period #	NO	XX	—	0 TO 8	—	—
Maintenance Display	OVERLAST	Timed-Override in Effect	NO	YES/NO	—	YES/NO	—	—
Maintenance Display	OVR_HRS	Timed-Override Duration	NO	XX	HOURS	0 T0 4	—	—

APPENDIX A — CCN POINTS (cont)

OUTPUTS — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	CMPA1	Compressor A1	NO	ON/OFF	—	ON/OFF	OUTPUTS	A1
Maintenance Display	CMPA2	Compressor A2	NO	ON/OFF	—	ON/OFF	OUTPUTS	A2
Maintenance Display	CMPB1	Compressor B1	NO	ON/OFF	—	ON/OFF	OUTPUTS	B1
Maintenance Display	CMPB2	Compressor B2	NO	ON/OFF	—	ON/OFF	OUTPUTS	B2
Maintenance Display	MLV	Minimum Load Valve	NO	ON/OFF	—	ON/OFF	OUTPUTS	MLV
Maintenance Display	CONDFANA	Condenser Fan A	NO	ON/OFF	—	ON/OFF	OUTPUTS	OFC.A
Maintenance Display	CONDFANB	Condenser Fan B	NO	ON/OFF	—	ON/OFF	OUTPUTS	OFC.B
Maintenance Display	SFAN	Supply Fan State	NO	ON/OFF	—	ON/OFF	OUTPUTS	S.FAN
Maintenance Display	HS1	Heat Stage 1	NO	ON/OFF	—	ON/OFF	OUTPUTS	HS.1
Maintenance Display	HS2	Heat Stage 2	NO	ON/OFF	—	ON/OFF	OUTPUTS	HS.2
Maintenance Display	HS3	Heat Stage 3	NO	ON/OFF	—	ON/OFF	OUTPUTS	HS.3
Maintenance Display	HS4	Heat Stage 4	NO	ON/OFF	—	ON/OFF	OUTPUTS	HS.4
Maintenance Display	HS5	Heat Stage 5	NO	ON/OFF	—	ON/OFF	OUTPUTS	HS.5
Maintenance Display	HS6	Heat Stage 6	NO	ON/OFF	—	ON/OFF	OUTPUTS	HS.6
Maintenance Display	HIR	Heat Interlock Relay	NO	ON/OFF	—	ON/OFF	OUTPUTS	H.I.R.
Maintenance Display	PE_A	Power Exhaust Stage A	NO	ON/OFF	—	ON/OFF	OUTPUTS	PE.A
Maintenance Display	PE_B	Power Exhaust Stage B	NO	ON/OFF	—	ON/OFF	OUTPUTS	PE.B
Maintenance Display	PE_C	Power Exhaust Stage C	NO	ON/OFF	—	ON/OFF	OUTPUTS	PE.C
Maintenance Display	ALRM	Alarm Output Relay	NO	ON/OFF	—	ON/OFF		
Maintenance Display	SFAN_VFD	Supply Fan Percent Speed	NO	XXXX	%	0 TO 100%	OUTPUTS	S.VFD

STRTHOUR — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	HR_MACH	Machine Operting Hours	NO	XXXX	HOURS	0 TO 50000	RUN STATUS	HRS.U
Maintenance Display	CY_MACH	Machine Starts	NO	XXXX	—	0 TO 50000	RUN STATUS	STR.A
Maintenance Display	HR_CIRA	Circuit A Run Hours	NO	XXXX	HOURS	0 TO 50000	RUN STATUS	HRS.A
Maintenance Display	HR_A1	Compressor A1 Run Hours	NO	XXXX	HOURS	0 TO 50000	RUN STATUS	HR.A1
Maintenance Display	HR_A2	Compressor A2 Run Hours	NO	XXXX	HOURS	0 TO 50000	RUN STATUS	HR.A2
Maintenance Display	HR_CIRB	Circuit B Run Hours	NO	XXXX	HOURS	0 TO 50000	RUN STATUS	HRS.B
Maintenance Display	HR_B1	Compressor B1 Run Hours	NO	XXXX	HOURS	0 TO 50000	RUN STATUS	HR.B1
Maintenance Display	HR_B2	Compressor B2 Run Hourrs	NO	XXXX	HOURS	0 TO 50000	RUN STATUS	HR.B2
Maintenance Display	CY_CIRA	Circuit A Starts	NO	XXXX	—	0 TO 50000	RUN STATUS	STR.A
Maintenance Display	CY_A1	Compressor A1 Starts	NO	XXXX	—	0 TO 50000	RUN STATUS	ST.A1
Maintenance Display	CY_A2	Compressor A2 Starts	NO	XXXX	—	0 TO 50000	RUN STATUS	ST.A2
Maintenance Display	CY_CIRB	Circuit B Starts	NO	XXXX	—	0 TO 50000	RUN STATUS	STR.B
Maintenance Display	CY_B1	Compressor B1 Starts	NO	XXXX	—	0 TO 50000	RUN STATUS	ST.B1
Maintenance Display	CY_B2	Compressor B2 Starts	NO	XXXX	—	0 TO 50000	RUN STATUS	ST.B2

APPENDIX A — CCN POINTS (cont)

TESTOUTS — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	MAN_CTRL	Service Test mode	YES	ON/OFF	—	ON/OFF	SERVICE TEST	TEST
Maintenance Display	CMPA1TST	Compressor A1 Relay	YES	ON/OFF	—	ON/OFF	SERVICE TEST	A1
Maintenance Display	CMPA2TST	Compressor A2 Relay	YES	ON/OFF	—	ON/OFF	SERVICE TEST	A2
Maintenance Display	CMPB1TST	Compressor B1 Relay	YES	ON/OFF	—	ON/OFF	SERVICE TEST	B1
Maintenance Display	CMPB2TST	Compessor B2 Relay	YES	ON/OFF	—	ON/OFF	SERVICE TEST	B2
Maintenance Display	MLV_TST	Minimum Load Valve	YES	ON/OFF	—	ON/OFF	SERVICE TEST	MLV
Maintenance Display	CNDA_TST	Condenser Fan A	YES	ON/OFF	—	ON/OFF	SERVICE TEST	OFC.A
Maintenance Display	CNDB_TST	Condenser Fan B	YES	ON/OFF	—	ON/OFF	SERVICE TEST	OFC.B
Maintenance Display	SFAN_TST	Supply Fan Relay	YES	ON/OFF	—	ON/OFF	SERVICE TEST	S.FAN
Maintenance Display	ALRM_TST	Remote Alarm Relay	YES	ON/OFF	—	ON/OFF	SERVICE TEST	ALR
Maintenance Display	HS1_TST	Heat Stage 1	YES	ON/OFF	—	ON/OFF	SERVICE TEST	HS.1
Maintenance Display	HS2_TST	Heat Stage 2	YES	ON/OFF	—	ON/OFF	SERVICE TEST	HS.2
Maintenance Display	HS3_TST	Heat Stage 3	YES	ON/OFF	—	ON/OFF	SERVICE TEST	HS.3
Maintenance Display	HS4_TST	Heat Stage 4	YES	ON/OFF	—	ON/OFF	SERVICE TEST	HS.4
Maintenance Display	HS5_TST	Heat Stage 5	YES	ON/OFF	—	ON/OFF	SERVICE TEST	HS.5
Maintenance Display	HS6_TST	Heat Stage 6	YES	ON/OFF	—	ON/OFF	SERVICE TEST	HS.6
Maintenance Display	HIR_TST	Heat Interlock Relay	YES	ON/OFF	—	ON/OFF	SERVICE TEST	H.I.R.
Maintenance Display	PE_A_TST	Power Exhaust Stage A	YES	ON/OFF	—	ON/OFF	SERVICE TEST	PE.A
Maintenance Display	PE_B_TST	Power Exhaust Stage B	YES	ON/OFF	—	ON/OFF	SERVICE TEST	PE.B
Maintenance Display	PE_C_TST	Power Exhaust Stage C	YES	ON/OFF	—	ON/OFF	SERVICE TEST	PE.C
Maintenance Display	SFVFDTST	Supply Fan VFD Speed	YES	XXX	%	0 TO 100%	SERVICE TEST	S.VFD
Maintenance Display	ECONCTST	Economizer Position Test	YES	XXX	%	0 TO 100%	SERVICE TEST	ECON
Maintenance Display	ECONPTST	Economizer Power Test	YES	ON/OFF	—	ON/OFF	SERVICE TEST	E.PWR

VERSIONS — MAINTENANCE

DESCRIPTION	CCN POINT NAME	EXPANDED NAME	READ/WRITE PROPERTIES	DISPLAY	UNITS	DISPLAY RANGE	SCROLLING MARQUEE TABLE	SHORT DISPLAY NAME
Maintenance Display	MBB_SW	CESR131334	NO	XX-XX	—	TEXT	RUN STATUS	MBB
Maintenance Display	ECB1_SW	CESR131249	NO	XX-XX	—	TEXT	RUN STATUS	ECB1
Maintenance Display	ECB2_SW	CESR131249	NO	XX-XX	—	TEXT	RUN STATUS	ECB2
Maintenance Display	SCB	CESR131226	NO	XX-XX	—	TEXT	RUN STATUS	NAVI
Maintenance Display	EMM_SW	CESR131174	NO	XX-XX	—	TEXT	RUN STATUS	SCB
Maintenance Display	MARQ_SW	CEST131171	NO	XX-XX	—	TEXT	RUN STATUS	CEM
Maintenance Display	NAVI_SW	CESR130227	NO	XX-XX	—	TEXT	RUN STATUS	MARQ

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CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG

MODEL NUMBER _____

SERIAL NUMBER _____

DATE: _____

TECHNICIAN _____

Software Version

MBB	CESR131343--
ECB1	CESR131249--
ECB2	CESR131249--
NAVI	CESR131227--
SCB	CESR131226--
CEM	CESR13174--
MARQ	CESR131171--

RECORD ALL SETPOINTS AND CONFIGURATIONS LISTED BELOW FOR FUTURE REFERENCE

SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
UNIT		UNIT							Unit Configurations	Overall Unit Configurations		
		CTL.T		—	—	4	1	1=VAV RAT, 2=VAV SPT 3=TSTAT MULTI, 4=TSTAT 2STAGE, 5=SPT MULTI, 6=SPT 2STAGE	Unit Control Type	Used to select the type of capacity control	UNIT	CTRLTYPE
		SIZE		TONS	TONS	20 *	20 *	20,25,27,30,35, 40,50,60	20,25,27,30,35, 40,50,60	used to select the nominal size unit	UNIT	SIZE
		S.MLV		—	—	NO	NO	NO/YES	Minimum Load Valve?	Used to enable the minimum load valve option	COOL_CFG	MLV_SEL
		VS.FN		—	—	NO	YES	NO/YES	Variable Speed Fan?	used to enable inverter fan speed control	UNIT	VARSFAN
		IF.M		—	—	NONE	NONE	0=NONE, 1=SWITCH, 2=DELTA PRESS	Fan Status Monitoring Type	used to configure the type of fan status monitor. Delta pressure only avaliable on VAV units	SFS_WORK	SFS_MON
		IF.IS		—	—	NO	NO	YES/NO	Fan Fail Shuts Down Unit	Action taken if a fan failure is dectected FAN.S swtch	SFS_WORK	SFS_SHUT
		S.MM		—	—	NO	NO	YES/NO	MotorMaster Installed?	Used to configure unit to allow for the use of MotorMaster V	UNIT	MM_SEL
		DELY		MIN	MIN	0	0	0 TO 15	Minutes off time	time unit is off before next start	UNIT	DELAY
		MAT.S		—	—	YES	YES	YES/NO	Estimate MAT?	enable routine to estimate mixed air temp, Should be set to yes	UNIT, ECONDIAG	MAT_SEL
		R.MAT		—	—	NO	NO	YES/NO	Reset MAT Table	Used to reset the mixed air temperaturre table	EDT_WORK	RSETMATT
		DP.XR		—	—	NO	NO	YES/NO	Disch. Press. Transducer	not available at this time	UNIT	DP_TRANS
		FAN.M		X	X	0	0	0,1	Fan Mode (0=Auto, 1=Cont)	Used to configure fan operation during occupied periods	CONFIG	FANM
		SAMP		SEC	SEC	60	60	0 TO 720	VAV Unocc.Fan Retry Time	This controls the sample rate for checking the return air temperature by turing on the fan while in the unccupied mode.	CONFIG	SAMPMINS

*Default will be different depending on unit size.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG (cont)

RECORD ALL SETPOINTS AND CONFIGURATIONS LISTED BELOW FOR FUTURE REFERENCE

SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
COOL		COOL		—	—				Cooling Configuration	Cooling Control Configurations		
		HP.SP		F	C	110	110	80.0 to 150.0	Head Pressure Setpoint	Setpoint for head pressure control	UNIT	HPSP
		C.L.OA		F	C	40	40	-20 TO 40	Compressor Lockout Temp	Temperature below which compressors will be locked out	COOL_CFG	OATLCOMP
		C.FOD		SEC	SEC	60	60	0 TO 600	Fan-Off Delay, Mech Cool	Delay in sec to turn off fan when using cyclic incoor fan control in cooling	COOL_CFG	COOL_FOD
		C.TC.F		MIN	MIN	0	0	0 TO 60	TCST Cool Time/Temp Fact	Temperature compensated start configuration which is used to determine advanced start time before occupancy based on the following equation prestart time = (SPT-OC.SP)*KCOOL. 0, disables temperaturre compensated start	CONFIG	KCOOL
		Z.GN		—	—	1	1	-10.0 TO 10.0	Capacity Threshold Adjust	capacity control PID loop gain factor, normally set to 1	COOL_CFG	Z_GAIN
		A1.EN		—	—	YES	YES	ENBL/DSBL	Enable Compressor A1	Used to disable compressors in case of failure	COOL_CFG	CMPA1ENA
		A2.EN		—	—	NO	NO	ENBL/DSBL	Enable Compressor A2	Used to disable compressors in case of failure	COOL_CFG	CMPA2ENA
		B1.EN		—	—	YES	YES	ENBL/DSBL	Enable Compressor B1	Used to disable compressors in case of failure	COOL_CFG	CMPB1ENA
		B2.EN		—	—	NO	NO	ENBL/DSBL	Enable Compressor B2	Used to disable compressors in case of failure	COOL_CFG	CMOB2ENA
		A1.C.E		—	—	YES	YES	ENBL/DSBL	CSB A1 Feedback Alarm	Must be enabled if the compessor is enabled	COOL_CFG	CSB_A1EN
		A2.C.E		—	—	NO	NO	ENBL/DSBL	CSB A2 Feedback Alarm	Must be enabled if the compessor is enabled	COOL_CFG	CSB_A2EN
		B1.C.E		—	—	YES	YES	ENBL/DSBL	CSB B1 Feedback Alarm	Must be enabled if the compessor is enabled	COOL_CFG	CSB_B1EN
		B2.C.E		—	—	NO	NO	ENBL/DSBL	CSB B2 Feedback Alarm	Must be enabled if the compessor is enabled	COOL_CFG	CSB_B2EN
HEAT				—	—				Heating Configurations	Gas and Electric Heating Configurations		
		HT.TY		—	—	NO HEAT	NO HEAT	0=NO HEAT, 1=ELECTRIC, 2=2-STAGE GAS, 3=STAGED GAS	Heat Type (0,1,2,3)	Used to select the type of heating	HEAT_CFG	HEATTYPE
		N.HST		—	—	2 STAGE	2 STAGE	0=2 STAGE, 1=5 STAGE, 2=7 STAGE, 3=9 STAGE, 4=11 STAGE	Heat Stage Type	Used only for staged gas heat and selects the sequence that will be used	HEAT_CFG	HTSTGTYP
		OCC.H		—	—	NO	NO	NO/YES	Occuped Heating Enabled	Enables occupied heating for VAV	HEATSTAT, HEAT_CFG, CONFIG	HTOCCENA
		LAT.M		—	—	NO	NO	NO/YES	SAT Sensor Sense Heat	Yes = EDT sensor relocated to leaving ductwork which in needed for Linkage heat monitoring	HEATSTAT	HTLATMON
		E.FOD		SEC	SEC	30	30	10 TO 600	Fan-Off Delay, Elec Heat	delay in turning off fans for electric heat	HEAT_CFG	ELEC_FOD
		G.FOD		SEC	SEC	45	45	45 TO 600	Fan-Off Delay, Gas heat	delay in turing off fans for gas heat	HEAT_CFG	GAS_FOD
		H.T.CF		MIN	MIN	0	0	0 TO 60	TCST Heat Time/Temp Fact	Used for temperature compensated start in the heat mode and the prestart time prior to occupancy is calculated by Time =TCST time - Kheat *(ohsp - space temp). 0 Disables the function	CONFIG	KHEAT
		S.CP.M		%	%	45	45	5 TO 45	Max Cap Change Per Cycle	Max % capacity that can be added/removed at any time for staged heat control	HEATSTAT	HTCAPMAX
		S.PI.R		—	—	90	90	60 TO 300	PID Algorithm Rate	Staged gas PID factor, normally should not be changed	HEATSTAT	HTSGPIDR
		S.RIS		—	—	90	90	60 TO 300	PID algorithm rate	Staged Gas rise clamp	HEATSTAT	HTSGPIDR
		S.MR.D		—	—	0.5	0.5	0 TO 5.0	S. Gas DB Min.DF/PID Rate	PID rate of change factor	HEATSTAT	HT_MR_DB
		S.DB		F	F	2	2	0 TO 5.0	ST.Gas Temp. Dead Band	Deadband where changes will not be made	HEATSTAT	HT_SG_DB
		S.P.GN		—	—	1	1	0 TO 1.5	Proportional Gain	PID porportional gain factor	HEATSTAT	HT_PGAIN
		S.I.GN		—	—	1	1	0 TO 1.5	Integral Gain	PID integral gain factor	HEATSTAT	HT_IGAIN
		S.DGN		—	—	1	1	0 TO 1.5	Derivative Gain	PID dreivative gain factor	HEATSTAT	HT_DGAIN

CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG (cont)

RECORD ALL SETPOINTS AND CONFIGURATIONS LISTED BELOW FOR FUTURE REFERENCE

SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
TMPR		TMPR							Temperature Configurations	VAV Tempering configurations		
		T.CL		F	C	40	40	-20 TO 40.0	Tempering in Cool SASP	SASP = Supply Air Setpoint while cooling in tempering mode	SET_PNT	TEMPCOOL
		T.VO		F	C	65	65	-20 TO 80	Temperature Vent OCC SASP	SASP = Supply Air Setpoint while in the occupied vent mode	SET_PNT	TEMPVOCC
		T.VU		F	C	50	50	-20 TO 80	Tempr Vent Unocc SASP	SASP = Supply Air Setpoint while in the unoccupied vent mode	SET_PNT	TEMPVUNC
		T.PRG		F	C	50	50	-20 TO 80	Tempering Purge SASP	SASP = Supply Air Setpoint while in the purge mode	SET_PNT	TEMPPURG
ECON		ECON							Economizer Configurations	Economizer and Exhaust configurations		
		EC.EQ		—	—	YES	YES	NO/YES	Economizer Installed?	Used to enable and disable the use of an economzer	UNIT	ECON_ENA
		E.CGO		—	—	DIFF. DB.	DIFF. DB.	0-DRY BULB, 1=DIFF. DB, 2=OA ENTHALPY, 3=DIFF ENTHALPY,	Econ Changeover Select	Used to select the type of economizer changeover contrrol	ECONDIAG	ECON_SEL
		E.CTL		—	—	DIG/POSITION (do not change)	DIG/POSITION (do not change)	1=DIG/POSITION, 2=DIG/COMMAND, 3=ANALOG CTRL	Economizer Control Type	Used to configure the 4-20 ma output frrom the ECB1 board where 1=DIG/POSITION (digitial control but sends actual position out 4-20ma output), 2=DIG/COMMAND (digital control but sends commanded position out 4-20 ma output), 3=ANALOG CTRL (direct control 4-20 ma signal)	UNIT	ECON_CTL
		MIN.P		%	%	20	20	0-100%	Economizer Min Position	design occupeancy minimum economizer ventilation damper position	BLDGPRES, ECONWORK SET_PNT, AIRQUALT, ECONMIN	ECONOMIN
		OAT.L		F	C	60	60	55 TO 120	High OAT Lockout Temp	lockout economizer free cooling above this ambient, Note applies even when Enthalpy or Dewpoint control being used	ECONWORK, ECONDIAG	OAT_LOCK
		OA.EC		—	—	CURVE B	CURVE B	1=A CURVE, 2=B CURVE, 3=C CURVE, 4=D CURVE, 5=CUSTOM CURVE	A, B, C, D Curve Select	Economizer changeover curve for enthalpy using A to D curves and a custom curve based on enthalpy and drybulb	ECONWORK, ECONDIAG	OAEC_SEL
		OA.DL		F	C	55	55	50.0 TO 62.0	OA Dewpoint Temp Limit	above this dewpoint value the economizer is locked out. Used with any changeover contrrol when an outdoor air humidity sensor is present	ECONWORK, ECONDIAG	OADEWCFG
		OEN.C		Btu/lb	kcal/kg	27	27	18.0 TO 28.0	Outdr.Enth Compare Valve	above this value economizer locked out. Only used with custom curve changeover	ECONWORK, ECONDIAG	OAEN_CFG
		UFC.C		—	—	0	0	0=DISABLED, 1=UNOCCUPIED, 2=PREOCCUPANCY	Unocc Free Cool Config	Used to configure unoccupied free cooling	CONFIG	UEFC_CFG
		UFC.T		MIN	MIN	120	120	0 TO 720	Unocc. Free Cool Time	time before occupied to start free cooling	CONFIG	UEFCTIME
		TRM.E		—	—	Enabled	Enabled	ENBL/DSBL	Enable Economizer Trim	Will allow the economizer to be modulated closed when compressors are on to provide better economizer control and less compressor cycling	UNIT	ECTRMENA
		EC.CB		F	C	2	2	0.5 TO 5.0	Economizer Temp Deadband	This is an EDT deadband where the economizer will not move when free cooling	ECONWORK	ECONBAND
		PWRX		—	—	none	none	0=NONE 1=2, STAGE, 2=MODULATING	Power Exhaust Type	Used to select the type of power exhaust control	BP_CNTL	PWRX
		PWRM		—	—	4	4	1=4 MOTORS, 2=6 MOTORS	Power Exhaust Motors	Used to select the number of power exhaust fans. 4 on 020-050 units and 6 on 060 units	BP_CNTL	PWRM
		PE1.P		%	%	35	35	0 TO 100	PE Stage 1 Econo Position	damper position when exhaust stage 1 will turn on	SET_PNT	PE1_POS
		PE2.P		%	%	75	75	0 TO 100	PE Stage 2 Econo Position	damper position when exhaust stage 2 will turn on	SET_PNT	PE2_POS

CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG (cont)

RECORD ALL SETPOINTS AND CONFIGURATIONS LISTED BELOW FOR FUTURE REFERENCE

SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
SVFD		SVFD							SF VFD Parameters			
		SP.S				DSBL	ENBL	ENBL/DSBL	Duct Static Pressure Sensor	Enables and disables the use of a supply duct pressure sensor	UNIT	SPSENS
		SP.C		—	—	none	VFD Control	1=NONE, 2=VFD CONTROL	Static Pressure Control	Enables to use of VFD control for building pressure control. Only applies to VAV	CONFIG	STATICFG
		SF.MN		%	%	20	20	20 TO 40	IDF VFD Minimum Speed	minimum VFD speed, do not set on inverters which must be set to 0	SFANVFD	SVFD_MIN
		SF.MX		%	%	100	100	50 to 100	IDF VFD Maximum Speed	maximum VFD speed	SFANVFD	SVFD_MAX
		SF.FS		%	%	100	100	0 T0 100	IDF Speed In Fire Mode	VFD speed in fire modes	SFANVFD	SVFD_FSD
		SP.KP		—	—	20	20	0.0 TO 100.0	Prop. Gain SF VFD	Control Loop Porportional Gain Factor (do not change)	SFANVFD	SPKP
		SP.KD		—	—	0	0	0 TO 50.0	Diff. Gain SF VFD	Control Loop Differential Gain Factor (do not change)	SFANVFD	SPKD
		SP.KI		—	—	2	2	0.0 TO 50.0	Integral Gain SF VFD	Control Loop Integral Gain Factor (do not change)	SFANVFD	SPKI
		SP.K		—	—	1	1	0.0 TO 50.0	System /gain SF VFD	Control Loop gain Factor (do not change)	SFANVFD	SPK
		SP.DT		sec	sec	2	2	1 TO 200	VFD PID Time (Seconds)	Control Loop PID time Factor (do not change)	SFANVFD	VFD_TIME
		SP.H.L		in-H2O	cm-H2O	5	5	-10.0 TO 10.0	Duct Press Sensor HI end	used to set upper range on the supply duct pressure	SENSWORK, SENSCNFG	SP_HIGH
		SP.L.L		in-H2O	cm-H2O	0	0	-10.0 TO 10.0	Duct Press Sensor Lo end	used to set the lower range on the supply duct pressure	SENSWORK, SENSCNFG	SP_LOW
BP									Building Pressure Params	Building pressure control configurations		
		BP.SL		—	—	2	2	1,2,3	Modulating PE Alg Select	1,2,3 use routine 2 (do not change)	BP_CNTL	BPSELECT
		BP.S		—	—	DSBL	DSBL	ENBL/DSBL	Building Pressure Sensor	enables the use of the building pressure sensor	UNIT	BPSENS
		BP.R		in-H2O	cm-H2O	0.25	0.25	0 TO 1	Bldg Press (+/-) Range	use to set range of sensor (+/- limit)	SENSWORK, SENSCNFG	BP_RANGE
		BP.ZG		—	—	1	1	0.1 TO 10	BP Threshold Adjustment	Threshold adjustment (do not change)	BP_CNTL	BPZ_GAIN
		BP.DT		MIN		1	1	1 TO 10	BP PID Evaluation	PID factor (do not change)	BP_CNTL	BPPERIOD
		BP.HP		in-H2O	cm-H2O	0.05	0.05	0 TO 1.0	High BP Level	Building Pressure Upper Differential limit (use with routine 2)	BP_CNTL	BPHPLVL
		BP.LP		in-H2O	cm-H2O	0.04	0.04	0 TO 1.0	Low BP Level	Building Pressure Lower Differential limit (use with routine 2)	BP_CNTL	BPLPLVL
IAQ									IAQ Configuration	Demand Ventilation Configuration		
		IA.CF		—	—	0	0	0=NO IAQ, 1=DCV, 2=OVERRIDE IAQ, 3=CNTL MIN POS, 4=MIN POS POT,	IAQ MinPos Sensor Config	Used to configure the use of IAQ control	AIR_QLTY, AIRQUALT	IAQANCFG
		IA.FN		—	—	0	0	0=NEVER, 1=OCCUPIED, 2=OVERRIDE IAQ	IAQ 4-20 ma Fan Config	Used to configure IAQ fan control when using the 4-20 ma input	AIR_QLTY, AIRQUALT, ECONMIN	IAQANFAN
		IA.I.C		—	—	0	0	0=NO IAQ, 1=DCV, 2=OVERRIDE IAQ	IAQ Discrete Input Config	Used to configure IAQ discrete input	AIR_QLTY, AIRQUALT, ECONMIN	IAQINCFG
		IA.I.F		—	—	0	0	0=NEVER, 1=OCCUPIED, 2=ALWAYS	IAQ Disc.In Fan Config	Used to configure fan control when using the IAQ discrete fan input	AIR_QLTY, AIRQUALT, ECONMIN	IAQINFAN
		AQ.MP		%	%	0	0	0 TO 100	IAQ Demand Vent Min Pos.	minimum position when IAQ below limit	BLDGPRES, ECONWORK, SET_PNT, AIRQUALT, ECONMIN	IAQMINP
		MIN.I		%	%	20	20	0 TO 100	Economizer Min Position	Economizer minimum occupied position, reference valve should be set in setpoint screen	BLDGPRES, ECONWORK, SET_PNT, AIRQUALT, ECONMIN	ECONOMIN

CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG (cont)

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SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
IAQ (cont)		PRG.E		—	—	DSBL	DSBL	ENBL/DSBL	IAQ Purge	used to enable pre-occupancy purge	CONFIG, AIRQUALT	PURGEN
		PRG.D		MIN	MIN	5	5	5 TO 60	IAQ Purge Duration	This is "how long do we purge."	CONFIG	IQPD
		PG.LT		%	%	10	10	0 TO 100	IAQ Purge LOTemp Min Pos	low limit on damper position during purge	SET_PNT	LTMP
		PG.HT		%	%	35	35	0 TO 100	IAQ Purge HITemp Min Pos	high limit on damper position during purge	SET_PNT	HTMP
		OVR.P		%	%	100	100	0 TO 100	IAQ Econo Override Pos	position of damper when override is in effect	AIR_QLTY, AIRQUALT, ECONMIN	IAQOVPOS
		OA.CF		—	—	No OAQ	No OAQ	0=NO OAQ, 1=DCV OAQ, 2=LOKOUT	OAQ 4-20ma Sensor Config	Used to configure OAQ sensor	AIR_QLTY, AIRQUALT, ECONMIN	OAQANCFG
		OAQ.U		—	—	400	400	400-2000	User-Configured OAQ	Used to set the reference level for OAQ when there is no OAQ sensor. Should be base on a locally measure value and is typically around 450-550	AIR_QLTY	OAQ_MEAS
		OAQ.L		ppm	ppm	0	0	0 TO 2000	OAQ Lockout Value	above this outside air ppm level the dampers will be closed to the min IAQ position	AIR_QLTY, ECONMIN	OAQLOCK
		AQD.L		ppm	ppm	100	100	0 TO 1000	Diff.Air Quality LOLimit	ppm level above outside air refrence for minimum setting of the IAQ curve	AIR_QLTY, ECONMIN	DAQ_LOW
		AQD.H		ppm	ppm	700	700	100 T0O 2000	Diff.Air Quality HiLimit	ppm level above outside air refrence for maximum setting of the IAQ curve	AIR_QLTY, ECONMIN	DAQ_HIGH
		DF.ON		ppm	ppm	400	400	0 TO 2000	DAQ PPM Fan On Setpoint	used to control indoor fan on at ppm level	ECONMIN	FAQFNON
		DF.OF		ppm	ppm	200	200	0 TO 2000	DAQ PPM Fan Off Setpoint	used to control indoor fan off at ppm level	AIR_QLTY, ECONMIN	DAQFNOFF
		I.4M		ppm	ppm	0	0	0 TO 5000	IAQ Low Reference	used with remoted 4-20ma IAQ and is the ppm level at 4 ma	SENSWORK, AIRQUALT ECONMIN	IAQREFL
		I.20M		ppm	ppm	2000	2000	0 TO 5000	IAQ High Reference	used with remote 4-20ma IAQ and is the ppm level at 20 ma	SENSWORK, AIRQUALT ECONMIN	IAQREFH
		O.4M		ppm	ppm	0	0	0 TO 5000	OAQ Low Reference	used with remoted 4-20ma OAQ and is the ppm level at 4 ma	SENSWORK, AIRQUALT ECONMIN	IAQREFL
		O.20M		ppm	ppm	2000	2000	0 TO 5000	OAQ High Reference	used with remote 4-20ma OAQ and is the ppm level at 20 ma	SENSWORK, AIRQUALT ECONMIN	IAQREFH
		I.CRV		ppm	ppm	0	0	-5.0 TO 5.0	Diff.IAQ Responsiveness	IAQ control curve responsiveness setting	AIR_QLTY, ECONMIN	IAQREACT
OPTS		OPTS							Option Sensor Config	Option sensor configurations		
		EDT.R		—	—	DSBL	DSBL	ENBL/DSBL	EDT Reset Input	enable remote reset signal feature	UNIT	EDTRSENS
		ECO.S		—	—	none	none	0=NONE, 1=ECON ENABLE, 2=POSITION OVERRIDE	Economizer Switch	Used to configure the use of an economizer switch and how it will be used	UNIT	ECOSWCFG
		FLS.E		—	—	DSBL	DSBL	ENBL/DSBL	Filter Stat.SW. Enabled?	enable remote filter status switch use	FLTSWORK, UNIT	FLTS_ENA
		SPT.S		—	—	DSPL	DSPL	ENBL/DSBL	Space Temp Sensor	enable use of T55, T56, T58 sensor	UNIT	SPTSENS
		STO.S		—	—	DSPL	DSPL	ENBL/DSBL	Space Temp Offset	Enable the use of T56 sensor offset feature	UNIT	SPTOSENS
		STO.R		F	C	5	5	1 TO 10	SPT Offset Range (+/-)	range for Offset feature adjustment	UNIT	SPTO_RNG
		R.RH.S		—	—	DSBL	DSBL	ENBL/DSBL	Return Air RH Sensor	enable the use of the return air humidity sensor	ENTHALPY, UNIT	RARHSENS
		O.RH.S		—	—	DSBL	DSBL	ENBL/DSBL	Ouside Air RH Sensor	enable the use of an outside air humidity sensor	ENTHALPY, UNIT	OARHSENS
		DMT.S		—	—	DSBL	DSBL	ENBL/DSBL	Demand Limit Input	enable the use of demand limit switch inputs	UNIT, DMDLIMIT	DEMLSENS
		RMT.C		—	—	NONE	NONE	0=NONE, 1=OCCUPANCY, 2=START STOP	Remote Switch Config	Used to configure the remote control switch and how it will be used	SCHEDOVR	RMTINCFG

CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG (cont)

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SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
CMF.D		ENTER							Comfort Demand Config	Demand Control Setpoints		
		LC.ON		F	C	1.5	1.5	-1 TO 2.0	DMD Level Lo Cool On	Used for Demand Driven Control Logic	CDMD_CFG	DMDLCON
		LC.OF		F	C	1	1	0.5 TO 2.0	DMD Level (-) Lo Cool Off	Used for Demand Driven Control Logic	CDMD_CFG	DMDLCOFF
		HC.ON		F	C	0.5	0.5	0.5 TO 2.0	DMD Level(+) Hi Cool On	Used for Demand Driven Control Logic	CDMD_CFG	DMDHCON
		LH.ON		F	C	1.5	1.5	-1 TO 2.0	DMD Level Lo Heat On	Used for Demand Driven Control Logic	CDMD_CFG	DMDLHON
		LH.OF		F	C	1	1	0.5 TO 2.0	DMD Level (-) Low Heat Off	Used for Demand Driven Control Logic	CDMD_CFG	DMDLHOFF
		HH.ON		F	C	0.5	0.5	0.5 TO 2.0	DMD Level (+) Hit Heat On	Used for Demand Driven Control Logic	CDMD_CFG	DMDHHON
		CT.LV		F	C	0.1	0.1	0.1 TO 5	Cool Trend Demand Level	Trend Temperature adjustment for demand cooling	COOL_CFG	CTRENDLV
		CT.TM		sec	sec	60	60	30 TO 600	Cool Trend Time (secs)	Trend time adjustment for demand cooling	COOL_CFG	CTRENDTM
		HT.LV		F	C	0.1	0.1	0.1 TO 5	Heat Trend Demand Level	Trend Temperature adjustment for demand heating	HEAT_CFG	HTRENDLV
		HT.TM		sec	sec	60	60	30 TO 600	Heat Trend Time (sec)	Trend time adjustment for demand heating	HEAT_CFG	HTRENDTM
RST		RST							Supply Air Reset Config	Supply air reset configurations		
		RST.T		—	—	None	None	0=NO RESET, 1=SPT RESET, 2=RAT RESET, 3=3RD PART RESET	Supply Air Reset Type	Configures the type of supply air reset	SET_PNT	SARSTCFG
		RTIO		—	—	3	3	0.0 TO 10.0	Reset Ratio	Used for supply air reset control	SET_PNT	RTIO
		R.LIM		F	C	10	10	0 TO 20.0	Reset Limit	used for supply air reset control	SET_PNT	LIMT
DMD.L		DMD.L							Demand Limit Config			
		DMLS		—	—	none	none	0=NO DEMAND LIMIT, 1=SWITCH, 2=4-20MA, 3=CCN LOADSHED	Demand Limit Select	Used to configure demand limiting options	DMD_LIM, DMDLIMIT	DMD_CTRL
		D.L.20		%	%	100	100	0-100	Demand Limit at 20 ma	% demand limit at a 20 ma demand signal	DMD_LIM, DMDLIMIT	DMT20MA
		LS.GN		—	—	0	0	0 TO 99	Loadshed Group Number	CCN loadshed group	DMD_LIM, DMDLIMIT	SHED_NUM
		LS.DD		%	%	0	0	0 TO 60	Loadshed Demand Delta	Used for CCN Loadshed	DMD_LIM, DMDLIMIT	SHED_DEL
		LS.TM		MIN	MIN	60	60	0 TO 120	Maximum Loadshed Time	Used for CCN Loadshed	DMD_LIM, DMDLIMIT	SHED_TIM
		DLS.1		%	%	80	80	0 TO 100	Demand Limit SW.1 Setpt	external switch controlled demand limit setpoint	DMD_LIM, DMDLIMIT	DLSWSP1
		DLS.2		%	%	50	50	0 TO 100	Demand Limit SW.2 Setpt	external switch controlled demand limit setpoint	DMD_LIM, DMDLIMIT	DLSWSP2
CCN		CCN							CCN Configuration			
		CCN.A		—	—	1	1	1 TO 239	CCN Address	CCN Unit address number	BRODEFS	CCNADD
		CCN.B		—	—	0	0	0 TO 239	CCN Bus Number	CCN bus number	BRODEFS	CCNBUS
		BAUD		BITS/SEC	BITS/SEC	9600	9600	2400, 4800, 9600, 19200, 38400	CCN Baud Rate	1=2400, 2=4800, 3=9600, 4=19200, 5=38400 CCN communication speed	BRODEFS	CCNBAUDD
		B.TIM		—	—	OFF	OFF	ON/OFF	CCN Time/Date Broadcast	enable CCN Time/Date broadcast	BRODEFS	CCNBC
		B.OAT		—	—	OFF	OFF	ON/OFF	CCN OAT Broadcast	enable CCN OAT broadcast	BRODEFS	OATBC
		B.ORH		—	—	OFF	OFF	ON/OFF	CCN OARH Broadcast	enable CCN OARH broadcast	BRODEFS	OARHBC
		B.OAQ		—	—	OFF	OFF	ON/OFF	CCN OAQ Broadcast	enable CCN OAQ broadcast	BRODEFS	OAQBC
		B.GS		—	—	OFF	OFF	ON/OFF	Global Schedule Broadcast	enable CCN schedule broadcast	BRODEFS	GSBC
		B.ACK		—	—	OFF	OFF	ON/OFF	CCN Broadcast ACK'ER	enable CCN ACK'ER broadcast	BRODEFS	CCNCACK

CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG (cont)

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SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
DISP									Display Configuration			
		METR		—	—	OFF	OFF	ON/OFF	Metric Display	enable metric unit display	DISPLAY	DISPUNIT
		LANG		—	—	ENGLISH	ENGLISH	ENGLISH, SPANISH, FRENCH, PORTUGUESE	Language Select	Only English at this time	DISPLAY	LANGUAGE
		PROT		—	—	ENBL	ENBL	ENBL/DSBL	Password Enable	enable/disable password protection	DISPLAY	PASS_EBL
		PSWD		—	—	1111	1111	0 TO 9999	Password Protection Must be dispabled to change Password	enter password	DISPLAY	PASSWORD
		TEST		—	—	OFF	OFF	ON/OFF	Test Display LEDs	used to check the operation of the display segments	DISPLAY	DISPTEST
SW.LG		SW.LG							Switch Logic NO/NC	No= normally open, NC=normally closed		
		DM.1.L				OPEN	OPEN	OPEN/CLSE	DMD.LMT.SW.1 Normally:	unpower status configuration of demand limit switch 1	DISLOGIC	DMD_SW1L
		DM.2.L				OPEN	OPEN	OPEN/CLSE	DMD.LMT.SW.2 Normally:	unpower status configuration of demand limiti switch 2	DISLOGIC	DMD_SW2L
		EC.SL				OPEN	OPEN	OPEN/CLSE	Economiz Switch Normally:	unpower status configuration of remote econo-mizer enable switch	DISLOGIC	ECOSWLOG
		EVC.L				OPEN	OPEN	OPEN/CLSE	Evacuation SW Normally:	unpower status configuration of fire evacuation switch	DISLOGIC	EVACLOGC
		FTS.L				OPEN	OPEN	OPEN/CLSE	Filter Status Normally:	unpower status configuration of filter status switch	DISLOGIC	FLTSLOGC
		FSD.L				OPEN	OPEN	OPEN/CLSE	Fire Shutdown Normally:	unpower status configuration of fire shutdown switch	DISLOGIC	FSDLOGIC
		IAQ.L				OPEN	OPEN	OPEN/CLSE	IAQ Disc. Input Normally:	unpower status configuration of IAQ override switch	DISLOGIC	IAQINLOG
		PRS.L				OPEN	OPEN	OPEN/CLSE	Press. Switch Normally:	unpower status configuration of fire pressurization switch	DISLOGIC	PRESLOGC
		PRG.L				OPEN	OPEN	OPEN/CLSE	Smoke Purge SW. Normally:	unpower status configuration of fire purge switch	DISLOGIC	PURGLOGC
		PMI.L				OPEN	OPEN	OPEN/CLSE	Remote Switch Normally:	unpower status configuration of remote remote control switch	DISLOGIC	RMTINLOG
		SFS.L				OPEN	OPEN	OPEN/CLSE	Fan Status SW. Normally:	unpower status configuration of fan status pressure switch	DISLOGIC	SFSLOGIC

CONTROLS SETUP CHECKLIST AND CONFIGURATION LOG (cont)

RECORD ALL SETPOINTS AND CONFIGURATIONS LISTED BELOW FOR FUTURE REFERENCE

SUBMODE	SUB SUBMODE	ITEM	SETTING	UNITS		FACTORY DEFAULT		RANGE ENGLISH	ITEM EXPANSION	COMMENTS	CCN TABLE	CCN POINT NAME
				English	Metric	VAV	CV					
ALLM		ALLM							Alert Limit Config	Used to configure limits of limit alerts		
		SPL.O		F	C	65.0	65.0	-10.0 TO 245.0	SPT LO Alert Limit/Occ	low space temperature alert limit (occupied mode)	ALRTLMTS	SPLO
		SPH.O		F	C	80.0	80.0	-10.0 TO 245.0	SPT HI Alert Limit/Occ	High space temperature alert limit (occupied mode)	ALRTLMTS	SPHO
		SPL.U		F	C	45.0	45.0	-10.0 TO 245.0	SPT LO Alert Limit/Unocc	low space temperature alert limit (unnccupied mode)	ALRTLMTS	SPLU
		SPH.U		F	C	100.0	100.0	-10.0 TO 245.0	SPT HI Alert Limit/Unocc	High space temperature alert limit (unnccupied mode)	ALRTLMTS	SPHU
		SAL.O		F	C	45.0	45.0	-10.0 TO 245.0	SAT LO Alert Limit/Occ	Low Supply air temperature alert limit (occupied mode)	ALRTLMTS	SAL
		SAH.O		F	C	180.0	180.0	-10.0 TO 245.0	SAT HI Alert Limit Occ	High Supply air temperature limit (occupied mode)	ALRTLMTS	SAH
		SAL.U		F	C	45.0	45.0	-10.0 TO 245.0	SAT LO Alert Limit/Unocc	Low Supply air temperature alert limit (un-occu-pied mode)	ALRTLMTS	SALU
		SAH.U		F	C	180.0	180.0	-10.0 TO 245.0	SAT HI Alert Limit/Unocc	High Supply air temperature limit (un-occupied mode)	ALRTLMTS	SALH
		RAL.O		F	C	60.0	60.0	-10.0 TO 245.0	RAT LO Alert Limit/Occ	Low return air temperature alert limit (occupied mode)	ALRTLMTS	RAL
		RAH.O		F	C	90.0	90.0	-10.0 TO 245.0	RAT HI Alert Limit/Occ	Low return air temperature limit (occupied mode)	ALRTLMTS	RAH
		RAL.U		F	C	35.0	35.0	-10.0 TO 245.0	RAT LO Alert Limit/Unocc	Low return air temperature alert limit (un-occupied mode)	ALRTLMTS	RALU
		RAH.U		F	C	120.0	120.0	-10.0 TO 245.0	RAT HI Alert Limit/Unocc	Low return air temperature limit (un-occupied mode)	ALRTLMTS	RAHU
		IRH.L		%	%	0	0	0 TO 100%	RH Low Alert Limit	return air humidity low alert limit	ALRTLMTS	RHL
		IRH.H		%	%	100	100	0 TO 100%	RH High Alert Limit	return air humdity high alert limit	ALRTLMTS	RHH
		DP.L		H2O	pa	0	0	0.0 TO 5.0	SP Low Alert Limit	Supply air pressure low level alert limit	ALRTLMTS	SPL
		DP.H		H2O	pa	2	2	0.0 TO 5.0	SP High Alert Limit	Supply air pressure high level alert limit	ALRTLMTS	SPH
		BP.L		H2O	pa	-0.25	-0.25	-.26 TO .26	BP Low Alert Limit	Building presure low alert limit	ALRTLMTS	BPLO
		BP.H		H2O	pa	0.25	0.25	-.26 TO .26	BP High Alert Limit	Building pressure high alert limi	ALRTLMTS	BPHI
		IQ.HI		ppm	ppm	800	800	0 TO 5000	IAQ High Alert Limit	Indoor air IAQ high alert limit	ALRTLMTS	IAQL

UNIT START-UP CHECKLIST

MODEL NO.: _____ SERIAL NO.: _____

SOFTWARE VERSION _____ TECHNICIAN: _____

DATE: _____

PRE-START-UP:

- ☐ VERIFY THAT DIP SWITCH SETTINGS ARE CORRECT
- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ REMOVE ALL COMPRESSOR SHIPPING HOLDDOWN BOLTS AND BRACKETS PER INSTRUCTIONS
- ☐ VERIFY INSTALLATION OF ECONOMIZER HOOD
- ☐ VERIFY INSTALLATION OF ALL OPTIONS AND ACCESSORIES
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ CHECK GAS PIPING FOR LEAKS (48A ONLY)
- ☐ CHECK THAT RETURN-AIR FILTER AND OUTDOOR-AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT IS LEVEL WITHIN TOLERANCES FOR PROPER CONDENSATE DRAINAGE
- ☐ CHECK FAN WHEELS AND PROPELLERS FOR LOCATION IN HOUSING/ORIFICE, AND SETSCREW IS TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED
- ☐ VERIFY THAT SUCTION, DISCHARGE, AND LIQUID SERVICE VALVES ON EACH CIRCUIT ARE OPEN
- ☐ VERIFY THAT CRANKCASE HEATERS HAVE BEEN ON 24 HOURS BEFORE START-UP.

START-UP:

ELECTRICAL

SUPPLY VOLTAGE L1-L2 _____ L2-L3 _____ L3-L1 _____

COMPRESSOR AMPS — COMPRESSOR NO. 1 L1 _____ L2 _____ L2 _____

COMPRESSOR AMPS — COMPRESSOR NO. 2 L1 _____ L2 _____ L2 _____

SUPPLY FANS AMPS (CV) _____ EXHAUST FAN AMPS _____

(VAV) _____ *

*VAV fan supply amps reading must be taken with a true RMS meter for accurate readings.

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry Bulb)

RETURN-AIR TEMPERATURE _____ F DB_____ F WB (Wet Bulb)

COOLING SUPPLY AIR _____ F

GAS HEAT SUPPLY AIR _____ F (48A ONLY)

ELECTRIC HEAT SUPPLY AIR _____ F (50A ONLY, IF EQUIPPED)

PRESSURES

GAS INLET PRESSURE _____ IN. WG (48A ONLY)

GAS MANIFOLD PRESSURE STAGE NO. 1 _____ IN. WG STAGE NO. 2 _____IN. WG (48A ONLY)

REFRIGERANT SUCTION CIRCUIT NO. 1 _____PSIG CIRCUIT NO. 2_____ PSIG

REFRIGERANT DISCHARGE CIRCUIT NO. 2 _____ PSIG CIRCUIT NO. 2_____ PSIG

☐ _____ VERIFY REFRIGERANT CHARGE.

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